SENSING COMMUTE SPACES AND AUTOMOBILIZED PLACES BY FOOT, BIKE AND CAR IN VANCOUVER, BC

Spine title: Sensing Commute Spaces by Foot, Bike and Car in Vancouver

Integrated Article Format Dissertation

By

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Graduate Program in Geography

A thesis submitted in partial fulfillment
of the requirements for the degree of
Doctor of Philosophy

The School of Graduate and Postdoctoral Studies
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Doctor of Philosophy

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Abstract

Some scholars argue that different modes of mobility produce different ways of knowing the world. Automobiles and their associated physical and social constructs are accused by some of alienating their drivers and those outside the car, whereas others see the human-machine hybrids they create as inherently connecting. Bicycling and walking are often seen as providing a more connected experience of places traversed, though the "automobilization" of these environments may conversely alienate cyclists and pedestrians through a host of social and environmental injustices, both local and global. Little empirical research has attended to this debate. This dissertation research is founded upon an epistemological position that sees knowledge (or knowing) as developed through sensual interactions with human and non-human environments and held within the body sometimes beyond words. Applying this perspective to the transportation debate evokes the guiding research question: how do the transportation practices of driving, bicycling, and walking differ in the way they shape an individual's understanding of their local environments and mobility? This grounded theory research draws on in-depth interviews with, and commute narrative recordings and GPS logs of forty-six drivers, cyclists, and pedestrians commuting in the City of Vancouver. Thematic foci include commuters' relationship to energy use over urban landscapes, the social and economic value of active transportation labour, and the social alienation, connection, and empathy associated with different modal hybrids. All three papers find different types and degrees of alienation associated with different transportation technologies. In general, increasing degrees of technological mediation may increase alienation, though the nuanced particulars complicate sweeping generalizations. With respect to the three modes explored here, automobility appears to alienate more than do cycling or walking. This research contributes new insights to mobilities, environmental epistemology, technology and society, environmental justice, and transportation and urban planning and policy.

Keywords: alienation, connection, embodiment, energy, environment, epistemology, human ecology, justice, knowledge, hybridity, labour, landscape, mobile methods, mobilities, senses, sustainability, technology, transportation, Vancouver.

Acknowledgements

I owe much gratitude to those who dedicated their time to mentor, provide feedback and edit my work. These individuals include: my supervisor Dr. Joy Parr, my committee members Dr. Tony Weis and Dr. Jamie Baxter, my external comprehensive examiner and transportation geography instructor Dr. Jean Andrey, my internal/external examiner Dr. Douglass St. Christian, my external examiner Dr. Bill Anderson, my visiting scholar supervisor Dr. Kay Teschke and the others in the School of Population and Public Health at the University of British Columbia, Dr. Julie McMullin in Sociology, the very helpful faculty in our department, and my friends and colleagues Dr. Pablo Bose, Steve Nielsen, Tor Oiamo, Dr. Paul Mkandawire, Karen Anne Ross, Mike Beard, and Dr. Pariss Garramone. I also wish to thank my research participants for the time they generously donated to this project, as well as the anonymous peer reviewers who reviewed some of this work. Finally, I would like to thank my parents and grandmother, who tolerated my often occupied and anxious presence while back in Victoria, for their selfless help. This research was financially supported in part by the Social Sciences and Humanities Research Council of Canada, and the Ontario Ministry of Training, Colleges, and Universities.

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Introduction

A 2006 survey by *Innovative Research Group, Inc.* for the *British Columbia Automobile Association* concluded that automobile drivers do not appear to connect their knowledge of the environmental impact of automobiles to their own practice of driving (Lyle 2006). Why aren't people getting out of their cars, despite widespread "knowing" that automobiles contribute significantly to global climate change and other environmental ills? Why is it that antipathy in conflicts between pedestrians, cyclists and drivers sometimes escalate to violence? Perhaps it is because the automobile transportation system, or "automobility", itself disconnects drivers from *feeling* their impact, and leaves those outside the system feeling powerless.

The books and articles that explore the relationship between transportation and the environment may be divided into those that query the effects of transportation on the non-human environment (e.g. the effects of road storm-drain run-off on fish), those that investigate the impact of transportation on humans and human environments (e.g. urban environments), and those that propose remedies for harmful impacts. All of these may be further divided by the mode or set of modes included in the studies, as well as the research approach or paradigm (e.g. quantitative neo-positivism, qualitative phenomenology, etc.), with common associations or antipathies between these categories.

Arguably the largest and best funded proportion of this research focuses on, and advocates what might be characterized as a 'technological fix' approach: monitoring and reducing of internal combustion engine tailpipe pollution, increasing energy efficiency, and finding new technological means to achieve these (Bae 2004). This research is most often motivated by issues such as climate change and the impacts of combustion particulates on human health. Whereas this research program is admirable and necessary, it sometimes chases red herrings, misleads the public, and ignores or obfuscates equally important transportation impacts. This is discussed further in the first chapter.

Traditional transportation geography and planning often utilizes a four-step model which offers a broader view of the issues at hand. The model steps include: trip generation, trip distribution, mode choice, and route assignment (Johnson 2004). Although this model is most often deployed in inquiries intended to reduce congestion and increase transportation network efficiency and accessibility, it may also provide a

useful perspective for sustainability objectives and is often included in behavioural Transportation Demand Management approaches (Litman 2008). For instance, some argue that reductions in trip generation, through such means as telecommuting, comprehensively reduce transportation impacts and the need for other measures (Andrey et al. 2004; Choo et al. 2003; Mokhtarian 1998). Although the four-step approach also is efficacious in many respects, at times it too leaves broader social, economic, and political questions unanswered or unproblematized.

Smaller, but increasing and increasingly recognized research programs that look at the human dimensions of the transportation and environment nexus have productively expanded the empirical methodologies and theoretical frameworks used to approach this. These include those that investigate the economic externalities of automobiles (see Litman 2009); transportation impacts on urban design and sprawl (see Freund and Martin 2007); associated health impacts (see Frank, et al. 2007); psychological and aesthetic impacts (see Sheller 2004; Taylor 2003); social and environmental justice issues (see Hine 2007; Sanchez and Brenman 2008); and experiential aspects (Spinney 2006; 2007). Most of these foci overlap and recognize a variety of transportation modes in addition to the automobile. Some of these scholars argue that different modes of mobility produce different ways of knowing the world. Automobiles and their associated physical and social constructs are accused by some of *alienating* their drivers and those outside the car, whereas others see the human-machine hybrids they create as inherently *connecting*. Bicycling and walking are often seen as providing a more connected experience of places traversed, though the "automobilization" of these environments may conversely alienate cyclists and pedestrians through a host of social and environmental injustices. With the exception of the work of Justin Spinney (ibid.), little published empirical research has attended to this debate.

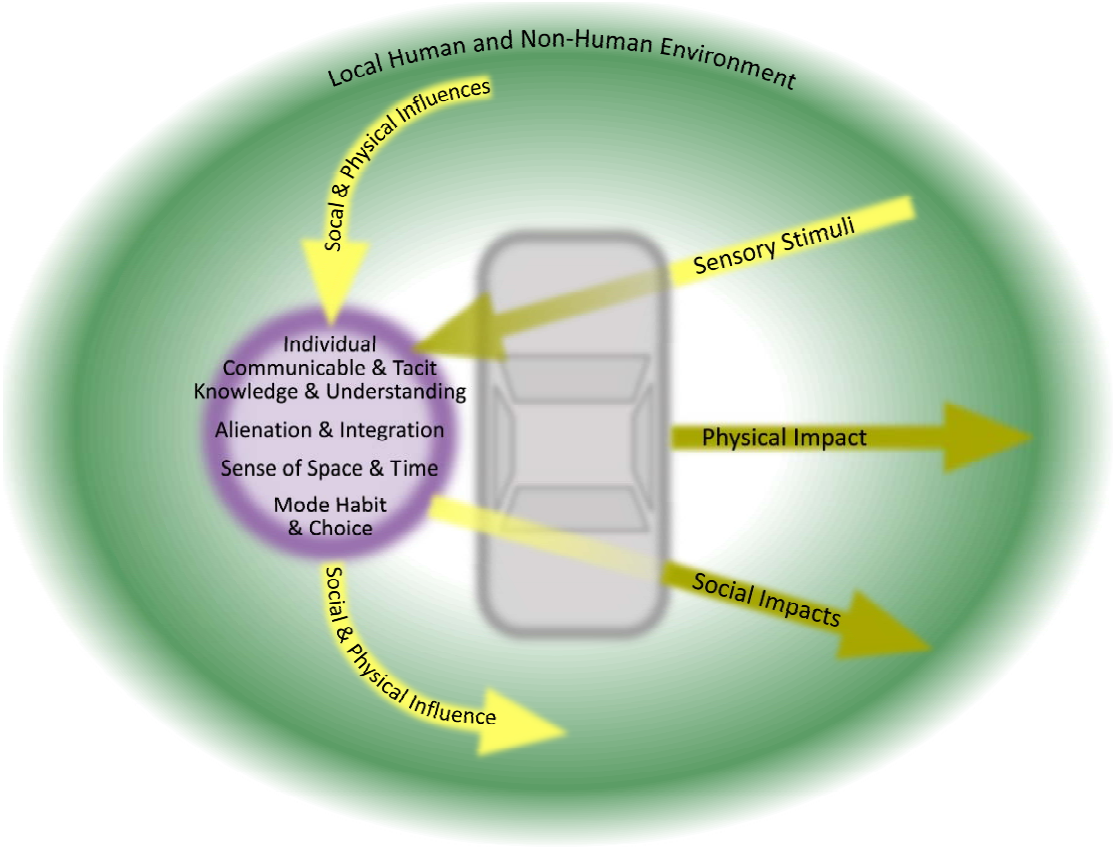
Qualitative and quantitative investigations of transportation decision making and planning have differed in their foci, queries, and contributions. Quantitative approaches most often tend to focus on issues of safety or measurable risk (see Aultman-Hall and Kaltenecker 1999), health impacts, the physical determinants of mode or route preferences (see Parkin, et al. 2007; Teschke, et al. 2008), variables feeding into the four-step travel model (see Cervero and Hansen 2002), socioeconomic and demographic

interactions (see Winters, et al. 2007), and costs-benefit analyses (see Schweitzer and Valenzuela 2004). Qualitative approaches seem to focus more on issues of law and rights (see Sanchez and Brenman 2008), policy, politics (see Rajan 2006), culture and identity (see Skinner and Rosen 2007), history (see Oddy 2007), relationships and networks, perceived risk (see Horton 2007), image, marketing, perceptual experience (see Bonham 2006), emotions (see Katz 1999), aesthetics (see Taylor 2003), discourse, lifecourse, and lifestyle impacts. These lists are not exhaustive, overlap is common, and exceptions abound. Quantitative studies predominantly focus more on "tuning" existing transportation theories and practices than qualitative studies, which have to some extent more often attempted to challenge the underlying assumptions of these. This may be owed to the transportation planning profession's "roots in traffic engineering" (Deka 2004:334), or the ways in which quantitative approaches serve the statistical needs of the four-step modeling process (Johnson 2004). In the research of transportation decision making and planning, qualitative approaches may allow researchers to access elaborate, "rational" or "irrational" (e.g. contradictory) behaviours, the often complex meanings and understandings attached to these, such as those associated with identity or emotion, and the embodied social and physical processes linking all. Depending upon the research design and how the methods and results are presented, qualitative approaches may also allow some degree of transferability (Baxter and Eyles 1997).

This dissertation asks how the technologically mediated mobility practices of driving, cycling, and walking differ in the way they shape individuals' understandings of their social and physical commute environments. It specifically queries the ways automobility may *alienate* both drivers, and those outside the car, by comparing the local environmental knowledge of drivers, cyclists and pedestrians, and argues for policy changes that attend to the injustices and transportation hierarchy this alienation perpetuates. It is built upon an epistemological perspective that sees knowledge as developed through sense-based interactions with one's environment and held within the body at various levels of consciousness and communicability. Whereas technologies are recognized as possessing a complex of affordances and capable of forming hybrids with their users, these are seen as all the more reason to carefully and critically consider their relationship to human understanding and combined environmental impacts. This research

also takes a broad view of environmental justice that includes social and economic dimensions, and recognizes qualitative, affective impacts and claims. Figure 1 illustrates the key relationships of concern. The fieldwork that provides the foundation for the empirical component of this research involved mixed methods, largely qualitative with some quantitative data collection. Instruments used included semi-structured interviews, commute narrative recordings and GPS data logs.

Figure 1. The relationships of interest to this project, as rendered by author.



The three chapters that comprise this integrated article dissertation present independent yet interrelated theories and ethnographic empirical results. This first chapter, “A Sense of Momentum: Mobility Practices and Dis/Embodied Landscapes of Energy Use”, investigates the relationship between commuters’ sense of energy use and uneven urban landscapes, and the ways mobility technologies intervene. The second chapter, “Am I not here? The Social Connection, Alienation and Empathy of Three

Mobility Practices in Vancouver, BC" looks at the ways technologically different mobility practices influence commuters' social connection and alienation. The last chapter, "Work to Bike: Should Pedestrians and Cyclists be Paid for Their Mobility Labour?" draws on the pay-for-housework debates, mobilities literature, and some empirical data to argue for increased material recognition of active mobility as valuable labour. The first and second chapters focus heavily on empirical findings, whereas the last uses these as a springboard to a more theoretical argument. All chapters consider the ways mundane technologies, as part of hybridized technological practices, connect or alienate the mobile body. All propose policy based on commuter experience and a desire for social and environmental justice.

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A Sense of Momentum: Mobility Practices and Dis/Embodied Landscapes of Energy Use

Accepted for publication in *Environment and Planning A*, October 16th, 2011.

April 16th, 2012
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Introduction

This article asks whether users of dissimilar transportation modes demonstrate different senses of energy use, and if so, in what ways. The response to this question builds theory related to the technological mediation of knowing, particularly the mobilities literature concerned with hybrids that alienate. It is also gravid with important transportation law and planning policy implications related to energy consumption, particularly with respect to the practices and perspectives these senses of energy use manifest. This connection between sense, practice, and policy is made throughout the article.

As Shaw and Hesse argue, transport geography has at times proven "theoretically light" whereas the mobilities literature is sometimes guilty of "over-theorising" at the cost of empirical support (2010:308). This article ties a traditional transport geography topic—energy conservation—to mobilities, and brings mobilities concerns with knowledge, embodiment, and alienation, to transport geography. Both aspects are anchored by empirical field research that unprecedentedly compares modes. This work also bridges what some have called the "intangible… ephemeral… sensory [and] kinaesthetic" (Spinney 2009:821) with concrete policy suggestions, and thus anticipates the "so what?" (Shaw and Hesse 2010:308).

The article begins with a review of the dominant literatures as they pertain to the topic: epistemology, the mobilities turn, transportation energy use, and policy. This is followed by a brief description of methods. The body consists of three sub-sections organized around the empirical themes: a sense of momentum, knowledge of contours and route choice, and neotechnological approaches to energy conservation. The article concludes with a discussion that further weaves the findings with general policy recommendations.

Literature Review

Epistemology & Mobilities

Michael Polanyi, in his *Tacit Knowledge* (1966), introduced the idea that hidden beneath the discursive rationales for particular research questions, and everyday actions, is a type of knowledge that eludes linguistic communication. In Polanyi's words: "we can

know more than we can tell" (p. 4). For instance, we can recognize the meaning of a composite of features, yet remain unable to individually identify their constituent parts, such as in the recognition of a human face. A number of scholars see this *adiscursive* knowledge as cultivated through interactions with environments. One school of thought in cognitive psychology sees perception as an embodied process, whereby the knowing body is simultaneously autonomous and yet mutually constitutive and emergent with its social and physical environment (Johnson 1999; Maturana and Poerksen 2004; Varela et al. 1991). Thus knowledge both constitutes, and is constituted by, sensual interactions with a world that includes the body itself (Harding 2002; Michael 2000; Thompson 1996), and awareness may precede conscious recognition and subsequent articulation (Hayles 1995). This view from the embodied cognition and feminist literatures resonates with several similar spatial/geographic formulations, including Nigel Thrift's (2008) non-representational theory and Edward Casey's notion that: "knowledge of place begins with the bodily experience of being-in-place" (2009:46).

It follows that technologies involved in sense experience and movement may shape perception and cognition and the simultaneous or subsequent actions guided by them (Bourdieu 1990). As Joy Parr writes: "the senses have been retuned by human experience with technology and the environment" (2010:11). Technologies may therefore "estrange" users from the relationships in which the technologies intervene. However, people, technologies, and environments are not conveniently discrete variables in linear causal relationships (Bissell 2010); rather, they tend to combine in ways that render fuzzy the distinctions between their components and between the assemblage itself and its context (Callon and Law 1995). Culture and landscape are bound up in these emergent tangles and co-constitutive (Balsamo 1996; Ingold 1993; Michael 2000). Each constellation of assemblage, sometimes called a "hybrid", provides different affordances and senses of these affordances to those involved. With respect to transportation, the use of the term "mode" signifies a particular assemblage of person, technology, landscape, culture, and *practice*.

Some scholars contend that different modes of mobility produce different sense experiences and ways of knowing the world. Automobiles and their physical and social constructs are accused by some of alienating their drivers and those outside the car,

whereas others see the human-machine hybrids they create as inherently connecting or extending. For instance, in "Driving in the City" (a play on de Certeau's "Walking in the City"; de Certeau 1986) Thrift (2004) argues that advances in software and ergonomics transubstantiate the automobile and driver into a reflexive, intelligent, fleshly hybrid, a naturalized embodiment, where "bare life is being laid bare" (p. 53; see also Dant 2004; Ihde 1975; Katz 1999; Latimer and Munro 2006; Sheller 2004). Conversely, Justin Spinney (2007) and Yi-Fu Tuan (1977) argue that places achieve "concrete reality" only when they are experienced fully through the senses, and argue that the dominant way of experiencing passing environments, through the automobile, limit sense experience largely to the visual (see also: Freund and Martin 2007; Sennett 1994; Taylor 2003). Cycling, walking, or running, on the other hand, may provide a more connected experience of places traversed, though conversely the "automobilization" of these environments may alienate cyclists and pedestrians through a host of social and environmental injustices that can only be known outside the car (Jain and Guiver 2001).

Several scholars present ambivalent or even contradictory appraisals. For instance, John Urry states that the "sights, sounds, tastes, temperatures and smells get reduced to the two-dimensional view through the car windscreen…" (2007:129) and that "the environment beyond that windscreen is an alien other, kept at bay through the diverse privatizing technologies incorporated within the car" (2006:23). Yet he also suggests that the car becomes an "extension of the driver's body" (2006:24) or even "…of the senses so that the car-driver can feel its very contours, shape, and relationship to that beyond its metallic skin" (2007:127). This apparent contradiction is likely owed to the complex nature of hybrids, where an assemblage may possess both beneficial and detrimental affordances. Thus we have Mike Michael declare that four wheel drives and footwear "reshape the affordances of nature by *expanding* the range of possible actions available to the body" (2000:112, emphasis added), and then later argue that they "parasitize" and "curtail" the human-environment relationship (p. 121). This is because walking boots and other mobility hybrids are not "simple conduits or intermediaries" (ibid.), but rather "multiplicitous – highly complex and contradictory" (p. 122).

Michael (2000) therefore cautions us to avoid grandiose political prescriptions for technological interventions owing to these manifold implications and meanings.

However, sometimes the recognition of the heterogeneity and interconnectivity of hybrids or assemblages undermines *all* political considerations. The hybrid concept is a transgression of binaries, surely, but it may also represent an ontological collapse into homogeneity (the unified hybrid) or conversely subscription to a relativist pluralism that leads to erroneously cheery conclusions. For instance, some mobilities discourse fails to grapple with the possibility that whereas drivers may have a strong proprioceptive sense of the car's body, they may also have a poor kinaesthetic sense of what the vehicle traverses, which may in turn precipitate socially and environmentally detrimental actions and consequences. This article takes the position that although prescriptive caution is prudent, hybrids and their interactions *are* problematic and political.

Although discussion and debate related to epistemological concerns around hybridity, alienation, and connection have flowed voluminously from the mobilities literature, with the exception of Spinney few have investigated the ideas empirically and none comparatively.

Transportation Energy & Planning

In 2007 transportation accounted for approximately 30% of Canadian energy use (Statistics Canada 2009), over half for passenger transportation, derived mostly from gasoline and diesel (Natural Resources Canada 2009). Yet, petroleum supplies are now reaching, or will soon reach, their peak (Almeida and Silva 2009; Kontorovich 2009; Maggio and Cacciola 2009), and beyond the early-mid century may not meet demand (Kjärstad and Johnsson 2009; Shafiee and Topal 2009). Renewable energy sources may be sustainable, but are unlikely to satiate contemporary demand, particularly within the transportation sector (see Rodrigue et al. 2006:207).

Review of the North American transportation and energy literature reveals that the most common and best funded approaches to the challenge of transportation energy conservation are new "advanced" "cutting edge" technologies (Adams 2004; Black 2010; Freund and Martin 1993; Hess and Scarpa 2010; see, for example: Åhman and Nilsson 2008; Bae 2004; Brown 2007; Lund and Clark II 2008; Sandén and Azar 2005), such as electric or hydrogen cars. Over the past decade Canada's budget for sustainable transportation "neotechnology" was over $460 million, compared to less than $37 million

for Transportation Demand Management (TDM). Technological gains in energy efficiency are often undermined by increases in demand—the so-called Jevons Paradox or rebound effect—unless accompanied by government intervention and cultural/behavioral change (Alcott 2005, 2008; Jevons 1965; Polimeni et al. 2009; Ruzzenenti and Basosi 2008; Sorrell 2009; Wackernagel and Rees 1997). Recent estimates of the long-term, direct rebound effect for motor vehicle fuel efficiency increases in the US and Canada are 20% to 25% (Barla et al. 2009; Small and Van Dender 2005). Therefore, technological solutions to energy shortcomings are sometimes trumped by insatiable needs for energy; I argue here that individuals' bodily disconnection from their own energy use obscures this problematic relationship.

Cycling and walking are often dubbed the "active modes" because of the cyclist's and pedestrian's physical involvement in their own propulsion. They are notably more energy efficient than driving. Assuming still air and flat surfaces, a pedestrian uses approximately one tenth and a cyclist one twentieth the energy of a single-occupant in a motor vehicle per kilometer (Whitt and Wilson 1982:176-186). This advantage is owed in great part to weight, speed, and surface area, and would therefore be difficult to match if new transportation technologies were to maintain the size, speed, and comfort expectations currently associated with automobility. This energy efficiency, as well as the complex of environmental, health, and safety benefits associated with the active modes renders them "the best of the best sustainable transport best practices" (Wellar 2007:17) and suggests their promotion (Bendixson 1974; Freund and Martin 1993; Whitelegg 1993). However, in North America particularly, cycling and walking are marginalized by auto-centric planning, engineering, politics, and legal regimes that manifest as laws and infrastructure incompatible with active modes (Banister 2002; Cresswell 2006; Freund and Martin 1993; Johnson 2004; Norton 2007; Patton 2007; Pucher et al. 2011; Roberts 1990; Whitelegg 1993). This article confronts those laws and infrastructures that impact active mode users' sense of energy use. The Government of Canada neither records nor estimates the energy use or kilometers traveled by cyclists or pedestrians.

The answer is complex as to why neotechnological automobilization is perennially dominant, while active modes continue to face barriers, particularly with regard to the

social milieux. For instance, the neotechnological approach allows capture of the consumers' surplus and is less likely to disrupt capital accumulation, so its widespread support, despite its questionable benefits, is perhaps not surprising, particularly with regard to the "automobile-industrial complex" (Foster 2002:92-99). The neotechnological status quo is also perpetuated by an "evolinear" cultural conception of transportation, whereby the technological norm "progresses" in a unidirectional, "evolutionary" path (Cox and Van De Walle 2007:120). To maintain or return to an earlier development, such as a bicycle, is seen as backward, regardless of suitability. Road safety and helmet laws, and promotional campaigns, ironically cultivate a perception of cycling as dangerous amongst a public that includes politicians, planners, and engineers. This then leads to spatial relocation and isolation of cycling and walking corridors to distant locations impractical for commuting (Adams 2004; Horton 2007). The findings provided in this article offer an additional explanation that hinges on people's understanding of energy use as developed through mundane daily commutes.

Methods

This research is part of a broader project that explores how different transportation modes mediate their users' understandings of social and physical environments. It is comparative and follows grounded theory as described by Charmaz (1995/2004; 2000; 2006). The sample was selected purposively to maximize demographic and commute route heterogeneity. Participants were recruited between April 2009 and January 2010 from the population of those working and/or living in the City of Vancouver, BC (CoV) through posters, newspapers ads, and internet classifieds. This location possessed the highest per capita cycling and pedestrian trip rates for major urban centers in Canada (Winters et al. 2007). Sampling from the pool of respondents continued until theoretical saturation was reached at fifteen per mode plus one motorcycle rider (Bowen 2008; Guest et al. 2006). Few participants used strictly one mode, and their subsidiary modes allowed them to draw their own comparisons. Age and gender ratios were roughly representative of the Vancouver adult public[1].

[1] Please see participant demographics and interview question timeline at http://denvernixon.net/ThruTheWindshield/ThroughTheWindshield.htm

Participants were asked to a) complete a brief demographic and transportation history questionnaire, b) record a "commute narrative" of their vocalized stream-of-consciousness and log their route using a lapel microphone, digital voice recorder, and GPS logger for two round-trips of their commute, and c) shortly thereafter, take part in a ninety minute in-depth, semi-standardized, open-ended interview.

For the commute narratives, participants were asked to speak as inspired, including uncensored utterances. Listening to the recordings made it apparent that to some extent *the landscape interviewed the participant.* That is, the landscape, rather than an interviewer, stimulated the participants' feedback. This interpretation of the commute narrative recordings is not a claim to objectivity, however; as in Laurier's (2010) mobile video ethnography it was clear that the researcher was still to some extent present in the minds of the participants.

Interview and commute narrative transcripts were analyzed through multiple comparative readings and interpretive, focused coding. A Digital Elevation Model (DEM) and road network from GeoBase.ca were used to calculate the origin and destination elevations from the GPS information. An earlier version of this paper was distributed to those quoted for feedback. During the member check no contentions or corrections were suggested.

Only interview responses and commute narrative themes pertaining to energy are included in this article. Participant quotes are followed by the participant number and A, C, M, or P representing automobile driver, cyclist, motorcyclist or pedestrian, respectively. "CN" denotes a commute narrative quote.

The Sense of Momentum – Its Facilitation, Impediment, and Obfuscation

In classical mechanics momentum is defined as the product of mass and velocity, and in a closed system is conserved. However, commuters do not travel in a closed system. The maintenance of momentum and conservation of energy are determined by how a person moves across the landscape. Therefore, every participant was asked to describe their "sense of momentum". Although a sense of momentum and continuity was preferable for many commuters of all modes, the stories of the cyclists most vividly

revealed a *feel* for momentum, and a desire to maintain it, as can be found in these cyclists' quotes:

> I'm happier on the commute when I guess the momentum, the movement, doesn't stop… I'm like '*yes*' when I come up to an intersection and the light has just turned or there's still time for me to go across. I'm much happier. I love that sense of keeping moving rather than stopping and then having to get myself going again. [372C]

> I sort of think of it when I *feel* that there's a stretch that I can just boot it and there aren't going to be cars turning in front of me… I can just keep going on a straight stretch and that, I think, is the best feeling. [911C]

> Yeah I try to keep it up, right? It's just more efficient if you don't have to slow down and stop all the time. So I tend to keep spinning, keep going. So I don't like routes that have a lot of stopping. It impedes your flow. You want flow when you're riding to work. It keeps it efficient, it keeps you going. So maintaining momentum is pretty critical… Like in a car, obviously keeping your flow is good too. But it's more from a frustration perspective. On a bicycle you feel it. It's physical. So you're more inclined to keep that momentum going. Otherwise your legs hurt, you're breathing heavy and you just… you feel it. You pay for it… physically. [139C]

All cyclists described ways they felt the landscape through changes in momentum, and all expressed various ways of physically negotiating this connection. Almost all noted, some very passionately, the negative effect on momentum of traffic lights, stop signs (fourteen out of fifteen), and uphill slopes (nine out of fifteen). Worst for the cyclists was the combination of contour and traffic control—stops or traffic signals at the bottom of a hill, particularly with a rise after the potential stop (see Figure 2). Two cyclists compared their experiences with these particular landscapes of energy consumption to those of drivers:

> I guess it's definitely more important for us than cars… In a car you don't really care, right, because it's not your effort. It's a gas pedal so you don't really care as much… [Whereas on a bicycle] you stop at the top of the hill, wait for the light to go green and then you can carry your momentum all the way through. I guess stopping in weird places like that; people don't do that in cars. [767C]

> When you're going downhill and you're gathering a lot of momentum, and you have to come to a stop sign, and then start again, it's a lot of work, you can't just press on the gas and go, you have to really work at it to get that momentum going again. [981C]

Figure 2. Traffic signals at the bottom of hills were a particular annoyance for cyclists.

Fewer pedestrians mentioned stops at intersections (three out of fifteen), or hills (six out of fifteen). Besides these aspects, pedestrians described senses of momentum related more to psychological states, the kinaesthetic feeling of different body positions and gaits, and the movement of other people. As seen above, a number of both cyclists and pedestrians were aware of what they variously called their "pace", "flow", "cadence" or "stride":

> The only thing that makes me stop is when I come to an intersection and I have to stop. I'll notice things around me. It would have to be something quite unusual for me to change my stride. [674P]

> I like to get a bit of exercise and have a good cadence going, but I'm not busting my ass… I think more about cadence when I'm riding… [104C]

For some, this pace was determined by the traffic infrastructure: "the intersection crosswalk forces a pace—that sort of momentum over the entire journey" [428P]. In addition to these imposed, calculated, "rational" rhythms based on the affordances of the car-driver (Cresswell 2010; Lefebvre 2004; Spinney 2010a), pace or cadence was a tactic to manage threats to momentum:

> You're stopping and starting with crosswalks, too. So it's the start, and then the stop… so you're always trying to gauge it perfectly. [173P]

> I know when I need to go faster, when I need to slow down. Obviously you don't want to be stopping and starting. And I've worked out that… I can get all the way home without actually stopping at lights. [227C]

> If you can see that there's a stop light at the bottom of the incline, by stopping half-way through the block, and waiting for the light to change, you can just keep going. [911C]

> I know the light patterns on my route, and I will slow down so I don't have to stop. Because it's just such a pain to stop and start. [993C]

These kinaesthetically informed tactics that regulate flow and save energy echo those found by Spinney (2008a) in his research on cyclists in London, England. Ford and Brown (2006) agree with Czikszentmihalyi (1990) that a sense of flow may be found through performance where the skill and capability of the performer just matches the challenge of the experience. This explanation of flow is insufficient. Rather, these participants describe a self-organized harmonization between commuters' rhythms and those of their commute landscape, similar to Bale's runners (2004) or Spinney's cyclists (2010a). Game might call this "entrainment", whereby bodies that move learn "to be carried along in the flow… to become in tune with or in the train of… the rhythms or images or performance of others…" (2001:3). Adopting Bale's (2004) or Michael's (2000) view, flow or entrainment may also be interpreted as a sense of connection to the sublime, susceptible to interruption by pain as mentioned by participant 993C (see also Scarry 1985; Williams 1998).

Some drivers felt an absence of momentum, some claimed it was exclusively mental, and some did not notice. For a few, momentum was only felt kinaesthetically or proprioceptively during a change in their vehicle's vector—going over bumps, around corners or sliding to a stop—and was sometimes associated with feelings of loss of control:

> You're braking, but your momentum is taking you through the intersection and you can't really stop it. [699A]

> It's almost like you hydroplane over those bumps… I'm very aware of that particular section of road because the momentum [of flying over bumps], it feels like you're not always in control unless you slow down. [384A]

More motor vehicle users mentioned stops and lights than pedestrians (six out of sixteen), but only one out of sixteen mentioned the effects of contours, the

exception owed to a driver's light sports car that tended to decelerate on steep ascents and fly over crests. This is a significant absence, particularly when contrasted with the acute sense of slope described by the cyclists. The relationship between contour and sense of energy use is taken up again in the next section.

Not unlike the pedestrians and cyclists, a number of drivers spoke of altering their speed to get through all of the lights, though with no mention of contours:

> I like momentum, that's why I try to match my speed to what'll take me through the lights so I don't have to stop. I also try to drive without touching the brakes. [574A]

In most cases this involved slowing down, though in some it involved speeding up. For the active mode users, green and red lights were experienced through kinaesthetic sense. For the drivers, making lights was more a matter of psychological momentum. One driver noticed the mental feeling of momentum, but not necessarily the tonnage of the vehicle:

> In a car, there isn't a whole lot [of momentum]. I mean you're powered, right, there might be a spatial sense of momentum, but that's not as physical as it is mental. Your momentum's actually traffic flowing, you're not hitting all the lights, and there's a momentum there. [136A]

I asked twelve participants[2] to go into detail about stopping at stop signs and controlled intersections, as this was a recurring theme. Not surprisingly, most expressed an aversion to stopping, as did a number of participants in their commute narrative recordings:

> There's a stop-sign, which is kind of annoying, it's kind of hard to stop at the end of a hill… Another stop sign. Not a fan of stop signs, you can probably tell, as a cyclist. [627C_CN]

The majority of cyclists and drivers admitted to regularly performing the "Idaho Stop" or "California Stop"—i.e. a rolling stop. In "Why Bicyclists Hate Stop Signs" Fajans and Curry calculated that a stop every 300 feet would incur a 40 percent drop in the average speed of a 150lb. cyclist producing 100 watts of power. To maintain average speed despite the stop signs, 500 watts would be required, the ceiling of energy produced by an

[2] Two pedestrians, five cyclists, and five drivers.

elite racing cyclist (2001:29). In a large web-based survey and analysis of bike route preferences in Texas, Sener et al. (2009) found travel time and motor vehicle traffic volumes the most important attributes associated with bicycle route choice. Forcing the average speeds of cyclists or pedestrians to drop increases trip time, and thereby decreases the appeal of mode shift (Cools et al. 2009). The presence of stops along routes may explain one finding that cyclists in Minneapolis, MN, travel 67% further in order to include a trail facility, which is likely to have fewer stops, in their route (Krizek et al. 2007). As Spinney (2010a) found in his research on cyclists, slow and continuous motion is preferred over that fast and staccato.

Laws must be revisited and rewritten so as to allow pedestrians and cyclists to treat stop signs as yields, as with the State of Idaho stop law (Idaho State 2010); or, cities should review their stop-sign placement policies and change intersection stop-sign arrangements in favor of cycling and pedestrian corridors. As one cyclist stated: “They should have the stop signs… perpendicular to the bike routes so that on a bicycle you’re going non-stop instead of stopping all the time” [217C]. In Vancouver, certain riding infractions, such as rolling stops, are sometimes ignored by police, if not informally decriminalized, though penalties are still distributed during summer “blitzes” and when media frenzies on the topic pressure police crackdowns. These informal accommodations reinforce the public perception of cyclists as maverick rule breakers (Horton 2007; Skinner and Rosen 2007), despite the often less-than-exemplary stop sign compliance of the driving majority (see DeVeauuse et al. 1999; Fakhry and Salaita 2002). Further to these recommendations, light sequences should be timed to favor active modes, as they are along some streets in Copenhagen and Portland, OR. This is sometimes called, the “green wave” or “traffic signal optimization”. Changes to intersection laws, stop/yield junction configurations, and signal timing normalize the otherwise “inappropriate rhythms” (Spinney 2010a) of active transportation, and thereby encourage their use.

Knowing and Not Knowing Contours, Choosing Routes

> It is by riding a bicycle that you learn the contours of a country best, since you have to sweat up the hills and coast down them... Thus you remember them as they actually are, while in a motor car only a high hill impresses you, and you have no such accurate remembrance of country you have driven through as you gain by riding a bicycle.
> --Ernest Hemingway (1967:364)

Fajans and Curry contend that slopes too small to be noticed by drivers may significantly slow cyclists. For example, they suggest that: "a rise of just three feet in a hundred will cut the speed of a 150lb., 100 watt cyclist in half" (2001:30). Parkin et al. (2007) calculate a 75 percent drop in the distance accomplished by an average 75 watt cyclist riding over a route with constantly varying 3 percent slopes versus a flat route. One cyclist revealed his awareness of the relationship between origin, destination, and contour: "you're not going to want to go down a hill and then back up it, right, if you're going to end at the same height anyways" [767C]. Completing a trip that ends at a location higher than it begins will require more energy than the return trip, all other things being equal.

To explore this sense of contour and energy use participants were asked whether the elevation of the sidewalk or road outside their workplace was at a higher or lower elevation than the sidewalk or road outside their home, relative to sea level. Potentially biasing influences included longer trip distances that, particularly for the drivers, might obfuscate the differences in elevation, and changes in elevation that were visually obvious to participants, such as a drop of 75m over 2km. The ocean nearly surrounds the City of Vancouver, offering participants a clear visual reference plane.

Participant answers were compared with the GPS/DEM information with the exception of nine GPS data logs that possessed drift. Only 50%, or seven out of fourteen, of the participants who drove provided answers congruent with the GPS/DEM data. On the other hand, eight out of ten (80%) pedestrians and twelve out of thirteen (92%) cyclists provided answers that agreed with the GPS/DEM data. Are these results an indication that active mode users have a greater embodied sense of landscape contour and its energy demands? Despite the aforementioned biases, and the small sample size that precludes generalization, the notable differences between modes warrant further investigation.

For one driver, who sometimes rode a bicycle, the automobile rendered the landscape contours undifferentiated:

> The terrain here is pretty homogenous in a motor vehicle... in a car you don't notice… [the] really good hills here… You notice them on a bike, not so much in a car. But on a bike, there's nothing like having momentum if going down a hill. [136A]

This echoes Spinney's empirically informed assertion that, "in a car the sensory difference between driving up or downhill is neutral; on a bicycle it is only too obvious… the nature of cycling means that spaces otherwise rendered homogenous when travelling by car have widely varying characteristics" (2008a:29-30). A cyclist who used to drive made a similar claim as well as an explicit reference to tacit understanding:

> When you're driving, you're not as aware, you don't have to take into consideration the hills… Subconsciously I kind of know what routes to take and what routes not to take… And the [designated] cycling routes are not always the easiest routes. [981C]

This subconscious route knowledge may accrete through long-term repetition of kinaesthetic interactions with the local commute environment. These "habitual body memories" provide orientation in the spaces in which people reside (Casey 2009:117). The sometimes *a*discursive, orientation of the cyclists and some of the pedestrians in this study is imprinted with a tacit knowledge of hills and origin/destination elevations. Although some level of cognition emerges during the practice of wayfinding, it originates in the precognitive "joint action" between commuter and landscape (Thrift 2008:7). As Merleau-Ponty writes, "motility [sic], then is not, as it were, a handmaid of consciousness, transporting the body to that point in space of which we have formed a representation beforehand" (2005:161).

Winters et al. (2011a; 2011b) found that steepness was a major variable influencing decisions to cycle, though actual measured deviations from straightest paths to flatter routes by cyclists were minor, leading the team to believe this may influence mode rather than route choice. Using 2001 UK census data, Parkin et al. (2008) found that the most significant physical variable influencing bicycle mode share was hilliness. When choosing their routes, a number of cyclists and pedestrians in the present study were keenly aware of the impact of hills and the inappropriateness of many designated bike routes in this regard.

> I don't want to go up the hill at this moment. I don't have the energy. Go a flatter route. [280P_CN]

> Efficiency has to do with how hilly it is, so I'll do a lot of investigation to find out which [route is] going to avoid those 'let's go up ten blocks and then go down ten more immediately after that.' Meanwhile two blocks away is a flat street. [722C]

> Most of the time I tend to stick to bike routes, but… if I take one more street or more to get to the bike route... then that's got a big hill... I would prefer to use bike routes, but they're never practical. [905C_CN]

Interestingly, Sener et al. (2009) found gender differences in terrain preferences where male commuters were more likely to choose moderately hilly routes over flat routes and female commuters *vice versa*. Similarly, Ryley (2005) found west Edinburgh women notably more likely than men to choose the statement "Edinburgh is too hilly to cycle". All three of the preceding participant quotes, and the one following, were made by female participants.

The results of this study agree with Parkin et al. who suggest that active mode commuter corridors would be better aligned on the least hilly streets (2007). Policy should reflect this. A more radical approach might see the appropriation of lanes on flatter arterials for active mode corridors, and thereby invert the transportation hierarchy. The following participant suggested that hilly route designations may be owed to laziness on the part of city engineers:

> I'm all about finding easy grades which is why I don't always ride the bike routes in Vancouver, because I think they've been designed for the convenience of engineering or something because some of them are just too hilly. [372C_CN]

With regard to existing and planned hilly route allocations, City of Vancouver planners and engineers are due some defense. When designing new bike routes staff face a constellation of variables and a host of existing "invariables" in the form of precedent built environments, the "cumulative result of numbers of uncoordinated interventions" (Adams 2004:39). The autocentric decisions of the past corral the decisions of the present in a different kind of momentum, a form of urban "path dependence" (Dennis and Urry 2009). The concept of path dependence denotes, "a process of cumulative causation where the dominant feedback loops are self-reinforcing rather than self correcting…"

(Atkinson and Oleson 1996:609), and some have applied the notion directly to the urban context (Arthur 1988, 1999; Low and Astle 2009). In this article it applies to the solidification of regimes and systems in the built environment where automobility becomes locked in (Barter 2004).

In Vancouver automobile arterials were often built on the original omnibus track lines and thus claimed the flattest routes early in the city's history. In addition to path dependence, Mr. Jerry Dobrovolny, Director of Transportation for the CoV, and Mr. Lon LaClaire, Strategic Transportation Planning Engineer, stated in an interview with the author that a number of other variables thought to support bikeability are involved in route determination (e.g. low automobile traffic flow, street width, absence of buses), and that the higher ranking of these may sometimes force the allocation of bike routes onto hilly streets (2010: pers. comm.). However, this privileging of expert knowledge over the preferences informed by the embodied knowledge of cyclists and pedestrians undermines the purpose of the pubic consultation process, and therefore risks the disenfranchisement of certain publics and widespread discontent with costly infrastructural projects, as seen in London, England (Spinney 2010b). Clearly a balance is desirable.

Jaywalking, a form of route choice and a way that some pedestrians sought energy efficacy, was described, unprompted, by five participants. By crossing mid-block, or walking in diagonals relative to the street grid, pedestrians shorten their commute distance and avoid waiting at lights. They thus maintain the pace, or rhythm (Spinney 2010a), that better suits the affordances of their mode. Adams declares, "pedestrians are natural Pythagoreans, preferring the hypotenuse to the other two sides of the triangle, wherever possible" (2004:40). Yet, like cyclists ignoring stop signs, many see jaywalking as irresponsible and illegal, a view owed at least in part to the efforts of the early twentieth century automobile industry to clear the roads for cars by appropriating the pejorative term "jay" (a rural person in the city) (Norton 2007). Therefore, pedestrian mode share would likely benefit from mid-block crosswalks and the legalization, or at least the social decriminalization, of safe jaywalking through marketing campaigns.

Neotechnological Energy Conservation

Earlier, the co-constitutive relationship between people, culture, and technology, and the contemporary focus on neo-technological energy conservation, were discussed. Regardless of neo-technological gains in automobile energy efficiency, a two tonne, high-speed, large surface area car and driver will always require more energy to move than a pedestrian or rider and 15kg cycle moving at slower speeds. Why then, does acceptance of the neotech hegemony persist? With respect to transportation energy conservation, the popular neo-technological imperative may arise in part from the particular knowing of the driving majority.

All forty-six participants were asked how individuals, or society as a whole, could reduce energy use associated with transportation. Two drivers offered solutions focused solely on technological innovation. Four more drivers combined technological solutions with what could be described as Transportation Demand Management (TDM) measures. This quote exemplifies this synthesis:

> So we'll be a little more plan-oriented with our travel. To use more efficient ways to do our work. In other words, more efficient cars. I know eventually we'll have good, hybrid cars, or even something else. I don't know if it will be electric, but it will be something that will have a neutral effect on the environment. [754A]

Of the cyclists, none offered strictly neo-technological solutions, whereas three incorporated technological solutions with other TDM measures. Interestingly, none of the pedestrians suggested technological innovation.

The technologically mediated commuters were more often partial to neotechnological solutions. Drivers may be more likely to offer neo-technological solutions because of an alienated sense of the energy needed to move automobile tonnage. As Øvergård, Bjørkli and Hoff state:

> Technologically aided mobility does not allow for the same type of perceptual feedback as natural movement. Technological devices that do not demand physical exertion of the driver… lead to a *perceptually different* mode of moving compared with walking and running… the forces of production are externalized… (original emphasis, 2008:114, 116)

This also raises a policy concern—if most politicians, engineers, and transportation planners primarily drive, will this alienation affect their policy decisions?

Discussion

Themes related to energy use, such as momentum, awareness of origin and destination elevations, route choice, and strategic energy conservation perspectives that emerged in interviews and commute narratives for 46 commuters in the City of Vancouver, triangulate differences in the way each mode shaped participants' communicable and tacit knowledge of their landscapes of energy use, and how they negotiated these. Cyclists in particular articulated a more detailed and nuanced sense of momentum and the landscape features that influence it. Both cyclists and pedestrians were more aware of changes in trip elevation than were motor vehicle drivers, and both reportedly altered their behaviour to minimize energy use across the landscape. Drivers more often prescribed dubious technological solutions, as if less aware of the relationship between energy, mass, and speed.

At times the cyclists' landscape-energy awareness appears greater than that of the less technologically mediated pedestrians. As Parkin et al. suggest "the coupling of a rider with machine appears to heighten awareness of the effort being made" (2007:75). This productively complicates what would otherwise be a simple correlation between degree of technological mediation and alienation and reflects the complexity of hybridity. I suggest that it is the cycle-riders' faster velocity potential, greater velocity variability, and the ability to coast (even without a freewheel), that hyper-sensitizes them to the changes in momentum and rhythm brought forth by their commute landscapes. Ford and Brown write of the "sense of the surfer being surfed, rather than surfing" (2006:162); when traversing contours, sometimes the landscape moves the cyclist, and sometimes the cyclist "moves the landscape" in a relativistic sense.

The rhythm of movement in most contemporary cities is to a great extent disciplined and synchronized according to the affordances and socially determined demands of the motor vehicle system (Spinney 2010a), as well as the larger economic context in which this system is integrated (Harvey 1989; Lefebvre 1991; Sennett 1994). Building on Edensor and Holloway (2008), and Lefebvre (2004), Spinney (2010a) argues that this "beat" is rendered socially normative, or "natural", through its repetitive prevalence, the habituation to some degree self-organized through a dispersed field of power. Both pedestrians and cyclists will at times attempt to conserve energy by ignoring

some elements of this automobilized infrastructural/legal landscape through which they are obliged to move, thus rendering their movement comparatively arrhythmic or polyrhythmic. Tactics described in this research include jaywalking, re-routing, reinterpreting stop signs, and slowing, especially on hilltops, for lights to change. This is because, in part, they *feel* energy use. For the active mode users, navigating commute landscapes becomes a "tuned bodily practice" (Parr 2010:14) that conserves energy.

If communities wish to encourage a shift toward more energy efficient mobility, assumptions around modal equivalency must be abandoned. Tim Cresswell describes these assumptions within the context of an inequitable society:

> By generalizing the meaning and experience of mobility through rights talk all mobility becomes equateable… The experience of the white commuter driving her SUV into work becomes the same as the working class Hispanic worker negotiating an inadequate public transport system in order to get to work on time. (2006a, page 164; 2006b, page 750)

Spinney writes that: "cyclists (as one example) are expected to perform largely in the same way as their motorised counterparts despite experiencing strikingly different affordances and possessing divergent capabilities" (2010a:114). In the British Columbia Provincial Motor Vehicle Act a cycle rider is to be treated as a motor vehicle, with some exceptions (Province of British Columbia 2010). Assumptions that users of all modes must follow the same system and use the same, largely automobilized, environments for locomotion, in the interest of an assumed equity and orderliness, conflict with energy conserving practices cultivated through active mode use, and confuse the unique capacities of each. The absurdity of this becomes apparent in situations such as when a pedestrian must walk fifty metres along both sides of an arterial to arrive at their destination eight metres away from their origin, or when a cyclist traveling downhill at forty kilometres per hour must stop at the bottom before continuing. The qualitative differences and power and safety differentials within the assumed "one size fits all" system manifest an entrenched transportation hierarchy that clearly places drivers above cyclists, and cyclists above pedestrians (Bradshaw 1992; Handy 1993).

The laws and infrastructures predicated on these assumptions are due for change. As Spinney contends: "not all styles of movement are the same, and spatial prescriptions should acknowledge these complexities rather than ignore them in favour of a dominant

style of movement" (2008a:30). Encouraging the energy efficient practices of the active modes requires modification of the legal and infrastructural frameworks disciplining these practices to flatten or flip the hierarchy. Because the urban commute landscape is increasingly constructed as an "isotrophic surface" (Spinney 2010a:123) bodily energy expenditure is replaced as a planning variable by the seemingly boundless capacities of external energy sources. Transportation planning must recognize currently ignored variables of importance to active transportation, such as "effort expended" (Parkin et al. 2007:69). At the concrete level, this article recommends legislative changes to stop and jaywalking laws, physical changes to stop sign placements, and the relocation of active transportation corridors that favour uninterrupted momentum.

The preceding analysis suggests that drivers are alienated from the energy they consume to a greater extent than active mode users. Ingold (2000), Spinney (2008b), and Wylie (2002) all discuss how the kinaesthetic sense comes to displace the visual when moving oneself over contour: "we experience the contours of the landscape by moving through it, so that it enters – as Bachelard would say – into our 'muscular consciousness'" (Ingold 2000:203). Despite equal visual faculties, the drivers in this study failed notably more often than the pedestrians and cyclists to state the correct relationship between their origin and destination elevations. If this difference is representative, it may mean that the kinaesthetic sense builds a more embodied understanding of energy use than the visual, and agrees with Hein, Held, and Gower's 1963 and 1970 studies of the perceptual guidance of action which found that environments cannot be *functionally* known through visual perception alone (Hein et al. 1970; Held and Hein 1963).

The idea mentioned in the introduction that culture may circumscribe the mobility imagination within an evolinear framework is reflected in participant 754A's quote. As Cox and Van Der Walle contend: "automobile cultures find it almost impossible to move to lighter (and thus more efficient) vehicles because they do not fit expectations of what 'cars' should be" (2007:127). Ingold suggests that our practices tune our reception to particular types of information, and that this leads to the perception of a particular type of affordance (1992:46). The affordances of the automobile include effortless speed and increasingly comfortable shelter from the passing environment. I argue that the daily experience of effortless, "shielded" mobility creates unreasonable expectations of what

energy can, could, and should provide the mobile body. A similar sense of energy use is conveyed in Game's lucid description of the "effortless airy floating" and "energies set free" experienced through the horse-rider hybrid (2001:3). This belies the effortful energy expenditure of the horse. I write more about this experientially developed and culturally normalized offloading of work, and its efforts and pains, in the third chapter of this dissertation on the labour of active transportation. In the larger picture of energy reserves and intergenerational equity, motorists' ungrounded sense of energy use may lead to unrealistic expectations. In short, these socially constructed transportation hierarchies, and those of human dominion over nature "reassure a technologically overstimulated imagination that culture/man will prevail in his encounters with nature" (Balsamo 1996). Given that many transportation decision makers predominantly drive, perhaps the political obsession with the neotechnological is predictable. Indeed, the policy recommendations put forth in this article face the challenge of persuading those who drive to legislate or engineer changes that encourage travel modes foreign to their experience.

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Am I not here? The Social Connection, Alienation and Empathy of Three Mobility Practices in Vancouver, BC

April 26th, 2012

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Introduction

Standing at a bus stop on a rainy, downtown Vancouver street, you witness cars gathering at the intersection, their occupants barely visible through smoked glass and reflected light. Most sit and stare straight ahead, each one isolated from the next. A faint thumping of woofers mixes with the ticking, grinding, and gurgling of internal combustion engines from which occasional acrid wafts of semi-cooked fuel take flight. Behind the gleam of hard surfaces, on the other side of the street, a less orderly collection of pedestrians weave and mingle. Several are clearly "street people"; in worn out clothes and faces they run back and forth, talking, laughing and shouting with and at one another. It is clear from their exchanges that they are familiar and to some extent mutually supportive, if simultaneously ambivalent toward one another. One of them crosses the street and asks you if you can provide some change. Some drivers gaze through their windows at the two of you, and some stare straight ahead.

This paper argues that the technological mediation associated with certain forms of mobility practice, particularly automobility, alienates people from their social environment. The practices of walking, riding a cycle, and driving an automobile each possess different levels of technological mediation, such as the suspension between the driver and the road, or the shoe between the pedestrian and the ground. Some suggest that this mediation, particularly with regard to automobility, estranges the commuter from their local environment, leading to a form of "alienation". Others argue that the mobile person and their technology of mobility create a "hybrid", an assemblage that is no less connected than "bare" movement or that accusations of technologically induced alienation are exaggerated; see Nixon (Forthcoming).

Social networks and feelings of solidarity socially bind people. Absent this social cohesion, members of a society are more likely to defect in pursuit of their own self-interest. If it is true that the technological mediation of some modes alienates their users from others, then this may in part explain transportation problems such as road rage, or the challenges encouraging mode-shift from socially and environmentally detrimental modes to those more beneficial, despite abundant rational messages regarding the differences. Given that the majority of the North American public drives, if automobility socially alienates it may be one of several variables eroding solidarity more broadly.

This article begins with a literature review of key themes essential to the analysis of empirical evidence that follows. These themes include alienation, connection, the role of technology, and relevant facets of mobility such as isolation, communication asymmetry, road rage, the transportation hierarchy, and the status syndrome. After a background on methods the bulk of the paper turns to the qualitative results of field research in the City of Vancouver, moving from optimistic expressions of connection, to evidence of alienation, estrangement or marginalization, and finally on to promises of hope in the form of empathy. The article concludes with a summary of the main themes and a discussion of policy implications.

Literature Review

Alienation and Connection

The etymological origin of the word "alienate" is Latin, meaning "to transfer" (as in property) or estrange. Hegel described alienation as the separation of the conscious mind and the objects differentiated from it, the resolution of which can only be found through the dialectic unification of the poles of these dualities (Hegel [1807] 1931). Marx applied these ideas to the social construction of capitalism, whereby workers are estranged not only from the products of their labour but their "species being" itself (Burkett 1999; Kellner 2006; Marx [1867] 1976; Ollman 1976). Alienation has since been employed both inside and outside the Marxist tradition, examples of the latter to be found in psychology and sociology (see, for instance: Langman and Kalekin-Fishman 2006; Seeman 1959), philosophy (e.g. in the existentialist canons following Camus or Sartre), and environmental thought (see, for instance: Biro 2005; Evernden 1993). In the fields of sociology and psychology, Seeman (1959) proposed five facets of alienation: social isolation, powerlessness, normlessness, meaninglessness, and self-estrangement. Alienation in this article refers specifically to the psychological and physical disconnection associated with the loss, or transformation, of relationships and understanding otherwise maintained through more direct, sensual interactions with one's social environment. There exists, in the one who is alienated, a gap in knowledge of, identification with, or empathy for, "the other", and an accompanying social untethering. This knowledge may be conscious and effable, conscious and ineffable or unconscious

(Polanyi 1966; see also Nixon 2006 and Nixon Forthcoming). Alienation, as used here, may be vivified by the synonym "estrangement".

Alienation is thought to make individual lives miserable, even suicidal, and to potentially undo the "glue" that holds society together and allows it to function. The opposite of alienation is arguably "connection", or integration. Multidisciplinary literatures suggest that the more connected, integrated, or embedded the members of a group or society the more likely they are to feel solidarity and empathy, and thus productively cooperate with each other. There is no disciplinary hearth of connectivity research (Dutcher et al. 2007), rather, a range of subjects use the theme as an emergent concept. It is helpful to briefly summarize some theories and findings from sociology, human ecology, and game theory that are most relevant to the current topic.

Shared practice is more likely to form strong social ties and solidarity than interdependent, regulated, but ultimately isolated practices (Durkheim [1893] 1960). Social orientations characterized by high social integration and low formal regulation (e.g. rules) are significantly correlated with benevolent social and environmental action, whereas traditional political affiliation, demographic characteristics, and social orientations characterized by higher regulation and/or lower social integration, are not (Ellis and Thompson 1997a, 1997b; Douglas 1982; Durkheim [1897] 1951; Thompson et al. 1990). Those with this robust social connection, or "egalitarian" orientation (Thompson et al. 1990), distinguish little between the importance of environmental and social issues, and thus challenge the homocentric/ecocentric bifurcation of "do gooders" (see, for example, Merchant 1992), revealing perhaps these individuals' sensitivity to *relationships* in general. Dutcher et al. (2007) go so far as to argue that the reason why connectivity promotes helping behaviour is because the connected person ceases to distinguish between self and other. Social integration and cooperative action are also bound up with landscape, whereby people form stronger connections with closer, more familiar, and smaller scale places that possess, or come to possess, social meanings (Dutcher et al. 2007; Knez 2005; Macnaughten 2003; Neisser 1998; Riley 1992).

Laboratory experiments in game theory reveal a correlation between increasing levels of interaction and personalization and higher levels of cooperation and "other regarding behaviour". Conversely, people are less likely to cooperate and more likely to

act in self-interest the more anonymous the other participants in the game (Hoffman, et al. 1994, 1996). As Bohnet and Frey discovered: "anonymity and social isolation lead to heavy discounting of another person's well-being" whereas "solidarity increases with decreasing social distance" (1999:53). According to this literature, mutual or even one-way visual recognition/identification between players, without verbal contact, alone is enough to induce a statistically significant increase in teamwork or altruism (ibid.). Verbal communication further increases cooperation (Sally 1995), even outside of the lab after the experiment, though this is subject to the type of dialogue. This perhaps explains why personal narratives are so much more effective in motivating donations or purchases than are statistical accounts of mass injury or death (Trout 2009; Weinstein and Quinn 1983). As Schelling contends: "if we know the people, we care. Half the entertainment industry and most great literature is built on this principle" (1968:129-130). The key point found in this research is that stronger social connection and its associated cooperation is increased through non-verbal identification, interaction and/or interpersonal communication.

Technology

Aspects of our environments inform and constrain the constructive processes of our bodies, conceptualizations, and reasoning (Johnson 1999). As Hayles argues:

> The precise conditions of our embodiment have everything to do with the nature of [our] interactions. The range and nature of sensory stimuli available to us, the contexts that affect how these stimuli achieve meaning, the habituated movements and postures that we learn… all affect how learning takes place and consequently how the world comes into being for us (1995:56).

It follows logically that technologies involved in sense experience and movement, may also shape, extend, or limit perception and cognition, as well as the simultaneous or subsequent actions guided by them. Thus technologies, as both part of human bodies and their environments—the human-technology-environment assemblage—may intervene in the accretion of local social and environmental understanding. But what is the nature of this "intervention"?

Debate continues over the role technology plays in alienation and connection. Some believe technologies potentially mediate experience in such a way as to socially

alienate their users (see, for instance, Borgmann 1994 Simpson 1994). Marcuse (1964), working in the Marxist tradition, suggests that the technologies of production and consumption come to reify social relations by facilitating a "technological rationality" that normalizes what is considered rational according to particular political and commercial interests. Bull (2001) found habitual Walkman users increasingly disengaged with their immediate social milieu. In her study of new information and communication technologies (ICT) in not-for-profit environments, one of Miller's (2009) key findings was the sense of isolation and alienation felt by employees through the increased use of ICTs. Studies such as these suggest that technologies may 'estrange' users from the relationships in which technologies intervene. Others emphasize human *extension* as the predominant technological impact, and offer no accompanying critique (see, for instance, Cranny-Francis 2008, McLuhan 1964).

Feenberg (2002) and Kellner (2006) recommend that scholars overcome these common polemics that homogenize technology as either a source of, or a cure for, alienation. Many technologies both integrate and estrange: "technology can be an instrument of domination and destruction, or creative and life-enhancing depending on the technology in question, its specific uses in particular contexts, and the value and goals that are being pursued in particular situations" (Kellner 2006:53). Therefore, a more nuanced approach is desirable. Some authors also argue that it is the social relations that produce technologies that are alienating, rather than technology itself. This is likely true, as in the alienating affects of the capitalist mode of production (Marx [1844] 1961). However, given that technologies can be seen as both product and producer of epistemes and social relations (Feenburg 1999; Hansen 2000; Kellner 2006), i.e. having both ontological and constructivist features, they too are essential variables in the mix and therefore deserve attention. As I argue in an earlier article (Nixon, forthcoming), the dismissal of critical perspectives on technology and technological hybrids, on the basis of their indeterminate and plural qualities, is not only unproductive but potentially dangerous. As Kellner argues: "talking about technology and alienation is not just an academic affair… but rather concerns the fate of the human being in the contemporary world and thus requires serious reflection and discussion whether the changes in society, culture, and human existence are or are not beneficial, and what we can do to promote a

positive outcome and prevent a harmful one" (2006:48). Tainter (1988) suggests that increments in technological sophistication find marginal returns, such that at some point increasing sophistication increasingly undermines entire societies. As with Haraway's cyborgs (1991), hybrid assemblages both challenge and should be challenged.

Mobility

Driving, cycling, and walking are all technological practices with differing degrees of technological intervention. This paper argues that transportation technologies exist along a continuum of social costs and benefits—that is, each has positive and negative impacts, but that the balance of these impacts changes across the continuum, whereby an increased degree of technological intervention precipitates increased alienation. As argued above, the more disconnected and alienated the members of a group or society, the more likely social dysfunction. Looking at mobility specifically, certain qualities associated with transportation technologies, infrastructures and legal regimes potentially alienate individuals and lead to antisocial outcomes, both with respect to mobility and society as a whole. Examples include the isolation and communication asymmetry associated with the enclosed, speeding vehicle, the legally and infrastructurally embedded transportation hierarchy, and a "might-is-right" constellation of power relations. The alienation potentially manifested by these qualities may in the transportation context lead to road rage, the negative health effects of the status syndrome, and environmental injustice in the form of pollution and resource depletion. Transportation alienation may also contribute to broader senses of disconnection in the public at large.

In contemporary industrialized societies people tend to spend most of their time occupying technologically altered spaces designed to separate humanity from the otherwise uncontrolled environments manifest on earth. One may argue that through this separation humans estrange or alienate themselves from earthly existence and thereby become "extra-terrestrial", like the "aliens from outer space" often described in science fiction and horror. Much like these imagined figures most people in the technologically developed countries travel about in hermetically sealed capsules, capturing framed two

dimensional representations of the landscape, perceived primarily through fleeting vision. They then say they've, "done the Grand Canyon".

In their book *Carjacked*, Lutz and Lutz-Fernandez call this "capsule living" (2010:144), borrowing from Lieven De Cauter's *The Capsular Civilization* (2004), who was himself "haunted" by the idea originally put forth by Kisho Kurokawa (1969) and René Boomkens (1998). De Cauter contends that:

> To an increasing degree, transport is becoming the transit between controlled and enclosed zones… The capsule is a device that creates an artificial ambiente, which minimizes communication with the outside by forming its own time-space milieu, an enclosed (artificial) environment. All means of transport beyond a certain level of speed – and here lies the origin of the metaphor – become capsules: the train, the automobile, and the aeroplane and, obviously, the space capsule... The omnipresence of screens (television screens, computers screens and, as Virilio points out, windscreens) is part of capsularization… Our daily lives can be perfectly described as movement via transport capsules from one enclave or capsule (home, for example), to another (campus, office, airport, all-in hotel, shopping mall and so on) (2004:45-46, 82)

Synonyms found in the literature for the automobile body or shell include "carapace", "cage", "container" or "exoskeleton" (Louv 2008:35; Mapes 2009:16; Parr 2010:18).

Indeed, the automobile is a transportation technology specifically designed to isolate the driver from the passing environment (Freund and Martin 1993), with the possible exception of technologies thought to better connect the driver with particular conditions such as road surfaces. Road and parking space too is manipulated to minimize the influence of surrounding environments. Automobility, in providing a mobile, extra-terrestrial space, and a mediated, diminished sensory experience of the lands through which this space travels, may exacerbate delusional feelings of transcendence:

> …car drivers are located within a place of dwelling that insulates them from the environment that they pass through. The sights, sounds, tastes, temperatures and smells of the city and countryside are reduced to the two-dimensional view through the car windscreen… the environment beyond the windscreen is an alien other, to be kept at bay through the diverse privatizing technologies which have been incorporated within the contemporary car (Urry 2000:63)

Thus automobility may be expected to alter or hinder, if not eliminate, the driver's sensuous experience of, and embodied connection to, the world outside the speeding steel

carapace or concrete tarmac, including the social milieu. Information regarding its impacts and dependencies for most part do not feedback to the hybrid, and thus depreciate the driver's communicable and incommunicable knowledge of the human and non-human environments traversed, rendering them ignorant of their immediate, dispersed and latent connections. In this way automobility may alienate or estrange drivers from the spaces and beings they impact, and desensitize them to the environmental and social injustices their mode inflicts. This led Jain and Guiver to argue that: "the reasons for reducing car use can only be appreciated from the perspective 'outside the car'" (2001:582). Thus it may be said that automobility, as a way of knowing the world, is deficient. A possible outcome of this alienation is the reproduction of automobility itself, including the interconnected conglomerate of air and noise pollutants, human health impacts and collision safety concerns, socially exclusive built environments, constrained individual transportation options, aesthetic changes, and temporally and energetically restructured landscapes (see Nixon forthcoming). Drivers' sense of time and space, or energy and mass, may be altered; so too may be their sense of social position, risk, norms, values, and beliefs. Currently, these associations are speculative or anecdotal, and demand empirical elaboration.

But in keeping with Feenberg's (2002) and Kellner's (2006) prudent caution against polemics, it may not always be the case that the traveler replaces, or at least in part displaces, a hybridity with their larger environment with a seamless, sensual connection to their car. To the contrary, Casey reasons that:

> Reconnection [with the earth] is not limited to literal incursions into nature. Even if I am not walking in the wilderness but driving through it, I can be attentive to it. My bare glance can take it in, and I can ruminate on what I have seen. What matters most is not my precise mode of movement—how or by what means I move—but what my moving body lets me experience… Even as viewed from the I-91, that world, the natural world, was seen to possess its own inalienable configuration and depth. From within my speeding automobile, I could not help but notice an alluring set of places… all connected by shimmering sensuous surfaces. (Casey 1993:260,270)

Few would challenge that a sublime sense of connection between human and technological artefact can and does occur. However, whereas Casey's glances are likely pleasurable and full of information, are they missing anything that would otherwise be

experienced through slower, less encapsulated modes? With what exactly are all of his senses, not just the visual, engaged? Is he connected in the same qualitative way a pedestrian or cyclist would be? Conspicuous here too is his separation of the mode of movement from his body's experience. This denies the hybridity of the car-driver, but perhaps Casey's hybridity is so complete that he fails to distinguish the constituents and their impact. Sennett seems to confront Casey's sentiments when he writes: "Sheer velocity makes it hard to focus one's attention on the passing scene… Navigating the geography of modern society requires very little physical effort, hence engagement; indeed, as roads become straightened and regularized, the voyager need account less and less for the people and the buildings on the street in order to move" (Sennett 1994:18).

Keeping pace with the introduction of automobile technologies that allegedly increase the driver's connection to the experience of driving are those that decrease this connection (Louv 2008). This is especially so with cellular communication:

> Within our individual 'capsules' we have access to more and more technology, some of which we use to stay connected across 'capsules' with others who are spending too much time isolated and in transit... cell phones further disconnect drivers from those immediately around them—the others on the road with whom they are supposed to be interacting… Car technology can reconnect us to the people we have driven away from, but it can also disconnect us from those we are driving with. In either case we remain, in some way, alone (Lutz and Lutz-Fernandez 2010:147, 149)

The inattention cellular phones bring to drivers and walkers is dangerous both to oneself and to others and thus may also spur conflict.

Perhaps most problematic is the way new forms of technological mobility experience come to displace antecedent types, some of which may have had positive social benefits. Williams (2009) claims that US citizens spend an average of one out of six waking hours in their automobiles. This time spent in cars is time not spent outside of them, commuting or travelling through social spaces that may offer benefits to the individual or their community in the form of shared meaning creation or simply co-presence (Demerath and Levinger 2003). Elsewhere I term this displacement of some activities by other, arguably less healthy activities "temporal opportunity costs" (Nixon 2006). Referring back to the points made by Knez (2005) and Neisser (1998), perhaps the driver, in spending so much time in the automobile, comes to identify with the

automobile as place, rather than the places traversed. De Cauter writes: “the more mobile we become, the more capsular our behaviour: we are sedentary nomads (in the literal sense of seated travellers)” (2004:79). The social disconnection arguably established by this spatial and temporal displacement of more traditional interactions may increase fear (Putnam 2000; Sennett 1994). Throughout his book De Cauter suggests that capsularization fosters hyperindividualism and through this a feedback loop of increasing fear (2004). But hyperindividualism is not the only medium that connects capsularization and fear. Salerno argues that: “the failure to understand otherness intensifies the sense of personal vulnerability, which in turn leads to a need for guns, high fences, barbed wire, and more police. The home becomes a fortress—a safe haven removed from the savage world depicted on the television and in the tabloids” (Salerno 2006:261). And so too do increasingly large motor vehicles, such as SUVs, serve the function of fortress or “mobile gated communities” (Freund and Martin 2007:41) against the unknown other (see also Adams 2004). As Louv suggests: “we tend to fear or romanticize what we don’t know” (2008:134).

The isolation associated with encapsulated mobility may also bring about or aggravate harmful behaviour, such as road rage. Katz (1999) had his students conduct interviews with one hundred and fifty Los Angeles drivers on the topic. His most compelling argument is that the isolated, unidirectional nature of driving establishes a communication asymmetry ripe with potential provocation and misunderstanding. In contrast with pedestrians, whose interactions possess greater potential for face to face body language or even verbal communication (Goffman 1971), drivers sit facing each other’s rear ends, and have few communication options besides turn signals and horns. As such anger occurs only in particular patterns of spatial interrelationship; most road rage contexts involve forward movement with other vehicles moving in the same direction, as opposed to oncoming traffic or at intersections where most accidents occur. Katz argues that: “…what is essentially disturbing is that the other driver appears to be deaf [sic] to one’s own concerns… the disturbance provoked by the apparently impenetrable insulation of other drivers sometimes takes on existential dimensions” (1999:28). As such drivers are angered by what they experience as an inability to induce other drivers to recognize and adapt to their presence. In this way: “drivers project onto

each other, in accusations of idiosyncratic personal incompetence, the systematic incapacity that driving, as a method of going about in public, constructs for all." (25).

Katz later resorts to explicit hybridity explanations for road rage. For Katz: "what the angry driver seeks to defend, when he or she is cut off, is not the trajectory of the car, but the intertwining of the body and the car" (1999:45). I feel that this incorrectly places the root of road rage in the severance of the driver from the hybridized embodiment of the car. By adopting the language of hybridity, Katz's analysis stops short, in contrast with Michael (2001), who uses the notion of the car-driver hybrid to potentially expand and nuance explanation, a couple of examples of which are included here. Other explanations for road rage seem equally convincing, such as: the challenge to the assumed privilege and promise of unimpeded forward momentum and the anger this may provoke (ibid.); similarly, the transformation of the sense of freedom and power to one of entrapment and powerlessness; an inflated sense of self rendered so by the "armour" of the car; the stress associated with the contemporary "technologies of speed" which include cars, computers, or even paving stones (72); and most pertinent to this article, a severed hybridity not with the car, but with the greater environment including other people. The driver is indeed cut-off, but not from the car-driver hybrid. Rather, they are cut off from the communicative benefits of face-to-face interactions and from their society in general. The steel, glass, and plastic of most automobilized "bodies" form a barrier between the occupant and the rest of the world, a wall that reinforces the separation already manifest through the spatial and temporal, or rhythmic, dissonance (Freund and Martin 2007; Spinney 2004). As Demerath and Levinger argue: "we cannot excuse or explain ourselves to other drivers like we can to other pedestrians" (2003:229).

Similarly, Katz fails to address the possibility that the automobile, rather than putting people in positions where they may *be threatened*, actually places them in a position *to threaten* others owing to its size, weight, and armour. In this respect the automobile may serve as a weapon. Might-is-right approaches to power are socially condemned in most contemporary contexts—imagine drawing a knife to move to the front of a grocery store lineup—but the very prevalence, anonymity, and "slipperyness" of fast moving, encapsulated automobiles seem to preserve a space where physical power and violence are tolerated or even accepted. Automobility can be a realm of power

struggles in which the "social contract" that normally moderates such behaviour is thrown out the window of the speeding vehicle. Thus sophisticated behavioural law is required to maintain traffic order, where it is seldom so necessary otherwise, as in the case of walking (see Goffman 1971:9). However, this establishes a system of high regulation and low social integration that paradoxically cultivates a fatalistic orientation and a sense of loss of control. Thus at times modern automobility in congested cities and bottlenecks is impoverished of otherwise ambient levels of egalitarian, cooperative sensibilities. The intentionally extending technology of the automobile itself is partly responsible for this; when human adherence to legal regulations breaks down, the automobile offers few limits on extreme action, as proudly advertised by car manufacturers (Jain 2005; O'Connell 1998). If road rage is owed at least in part to a sense of loss of control (which is in turn exacerbated by the communication asymmetry of encapsulation), it may be somewhat analogous to Marx's alienated worker, who is also stripped of control. This seems particularly fitting given automobility's role in modern capitalism (Foster 2002; Lefebvre 1991).

Commenting on the weekend habit in Mexico City whereby drivers temporarily abandon their gridlocked cars to play in the streets while waiting, Katz writes: "what such events bring out is the fact, usually hidden in the privacy of contemporary lives, that anger emerges from a falling out from community and is curable by the resurrection of community along other lines" (1999:351, Fn 9). It is clear from this example that restoration of community is found through a change in the technological medium of interaction, particularly "de-automobilization". The positive effects of de-automobilization on the sociability of those outside the car has been demonstrated by Appleyard (1981), who found more isolation and alienation amongst residents on streets with heavy traffic, and more friendliness and involvement on streets with light traffic.

This discussion of road rage is largely limited to automobility, as it is the technological practice with which it is most commonly associated and for which there is most concern regarding public safety. If road rage were not so mode specific, parallel terms, such as "sidewalk rage", might exist. Road rage can and does occur amongst other mode users, though Michael argues that this is at once both the same and totally different, owing to the specific hybrids that are formed (2001). This specificity is not limited to

mode differences but exists within modes given the different purposes and associated design particularities of different vehicles.

Issues of power, safety, health, and fairness are not limited to road rage. The justice and transportation literature has predominantly focused on social justice, particularly distributive justice issues around accessibility (see, for instance, Blickstein and Hanson 2001; Bullard and Johnson 1997; Bullard, et al. 2004; Deka 2004; Patton 2007). For example, the inequitable distribution of affordable transportation within an economically and spatially stratified society may lead to situations where the inner city poor cannot reach the greater job opportunities of the surrounding suburban areas, a situation known as "spatial mismatch" (Hansen 2003). Little is published on environmental injustices in transportation, which are also necessarily social. There are some exceptions, however, such as Forkenbrock's and Schweitzer's "Environmental Justice in Transportation Planning" (1999), which attempts to routinize the quantitative approach to distributional environmental justice, Haynes's (2004) ever-cautious, positivist examination of the relationships between transportation networks, toxics release inventory locations, and socioeconomic variables, or Steingberg's (2000) more nuanced, somewhat Rawlsian discussion of the state of procedural justice in US transportation planning. Also, new research outside of the US environmental justice canon is attending to environmental justice issues of relevance to transportation planning (see, for instance, Buzzelli and Jerrett 2007; Cresswell 2006; Jain and Guiver 2001). Whereas the bulk of general environmental justice research has focused on temporal and spatial correlations of toxic exposure using technical approaches, some recognize people's perceived and/or embodied sense of injustice as an equally useful starting point (see Goldman 1996). This may be especially important when dealing with mobile sources, aesthetic degradation, and as discussed below, the environmental health impacts of social alienation. The popular division of what constitutes the "environment" into natural and social realms dissolves here. As Perhac states "(US) Executive Order 12898 also refers to 'environmental effects,' which are often taken by environmental justice advocates to include adverse psychic effects, disruptions to community integrity and cultural identity, and aesthetic factors such as unpleasant sights and odours that permeate the environment"

(2000:91). As mentioned earlier, those well socially integrated are less likely to differentiate between the two.

For cyclists and pedestrians, a host of social and environmental injustices in the form of air and noise pollution (and associated health and climate change risks), immediate lethal bodily threat, inaccessibility owed to trip distance, aesthetic decline, constrained route choice, social segregation and isolation arguably follow from automobile use. Although these injustices manifest as distributional issues (i.e. a disproportionate share of the harmful externalities of automobility are suffered by those outside the car), they are produced and reproduced through the procedural realm of urban and transportation planning, bylaws, criminal laws, larger social, political and economic institutions, and, as I argue here, the social alienation associated with automobility.

Some social disjunctions embedded in the contemporary transportation constellation contribute, alongside various physical relationships, to what many have termed the "transportation hierarchy" (Bradshaw 1992; Handy 1993). The inherent spatio-temporal incompatibility and arrhythmia between the various modes (Freund and Martin 2007; Lefebvre 2004; Nixon forthcoming; Spinney 2004) not only undermines intermodal communication, but, alongside the cultural normative of automobility, encourages mobility organized around the prioritization of some modes—usually those faster, bigger, and more expensive—over others. Extensive research into the effects of social status on health reveal that the lower an individual's social status, the lower their life expectancy and the worse their general health indicators, controlling for many competing and intervening variables such as income and lifestyle (see, for example: Berkman and Glass 2000; Chandola et al. 2004; Davey Smith et al. 1997; Fuhrer et al. 2002; Kawachi et al. 1997; Kuper et al. 2002; Marmot and Shipley 1996; Stansfeld et al. 2003; van Rossum et al. 2000). In fact, the wellbeing within wealthy countries is associated more with relative than absolute income, which reveals the significance of the psychosocial effects of status, inequality, degrees of control, and participation beyond material wealth alone (Marmot and Wilkinson 2001). This "status syndrome" (Marmot 2004) prompted one physician to call for research into the effects of the transportation hierarchy itself on human health, beyond intervening variables (Simpson 2008). The exact causal linkages are unknown, but it seems plausible that those using "second class"

modes may come to identify with this diminished status through both their hindered mobility as well as real or imagined social feedback along the lines of the "looking glass self", i.e. symbolic interactionism (Cooley 1902; Mead 1934)[3]. Thus social exclusion and isolation in transportation may ultimately fracture social cohesion and leave those at the bottom of the hierarchy in poorer health than they would be otherwise. The multitude of interacting variables complicate empirical proof of such a linkage, however; for example, one review and modeling exercise found cyclist life expectancy higher than those of the general population despite collision and air pollution impacts (de Hartog et al. 2010). The authors concluded that this was likely owed to the large health benefits of exercise.

Methods

This article presents results from field research conducted in the City of Vancouver between April 2009 and January 2010. The larger project explores how different transportation modes mediate their users' understandings of social and physical environments. Because it lacks empirical precedent it follows the grounded theory approach described by Charmaz (1995/2004; 2000; 2006), a constructivist methodological alternative to the originators' objectivist epistemological position (Glaser and Strauss 1967), and one that does not assume the absence of prior theory. A largely qualitative approach allows for rich description of participant meaning and the discovery of unexpected variables and relationships.

The City of Vancouver possesses the highest per capita cycling and pedestrian trip rates for major urban centers in Canada (Winters et al. 2007). Recruitment methods included: posters in bicycle shops, auto insurance brokerages, auto repair shops, and on bridges; hand-delivered post-cards on bridges and arterial bottlenecks; and advertisements in local newspapers, online classifieds, and special interest internet sites. Purposive sample selection maximized demographic and commute route heterogeneity, and maintained an equal quota from the three transportation modes of interest. Ten participants were "snowball" respondents who heard about the research through other

[3] Transportation technologies and practices are social symbols, and so their exchange as social currency is to be expected.

participants. Sampling from the pool of respondents ceased once "theoretical saturation" was reached, and the number of representatives of each mode was equal. Saturation occurs when theory building slows, replication and redundancy increase dramatically, and the dominant concepts distilled through the research process are largely confirmed by additional data (Bowen 2008). The final sample of forty-six—fifteen for each mode plus one motorcycle rider—is consistent with research that suggests theoretical saturation most often occurs within the first twelve interviews (Guest et al. 2006). Few participants used strictly one mode, but their subsidiary modes allowed them to draw their own comparisons. The age and gender ratios were roughly representative of the Vancouver adult public[4].

Participants were asked to a) complete a brief demographic and transportation history questionnaire, b) record a "commute narrative" of their vocalized stream-of-consciousness and log their route using a lapel microphone, digital voice recorder, and GPS data logger for two round-trip commutes, and, afterward, c) take part in a ninety minute in-depth, semi-standardized, open-ended interview.

For the commute narratives, participants were asked to speak as inspired, uncensored, including unpremeditated utterances. The recordings revealed that to some extent *the landscape interviewed the participant* during the commute narrative. That is, the landscape, rather than an interviewer, stimulated the participants' feedback. This interpretation of the commute narrative recordings should not be mistaken for a claim to objectivity, however; as in Laurier's (2010) mobile video ethnography it was also clear that the researcher was still to some extent present in the minds of the participants.

Grounded theory interview instruments "evolve" as the research proceeds—unproductive questions are dropped and new ones attend to emergent themes (Charmaz 1995/2004; 2000; 2006). However, the comparative design and wish to explore existing debates required some level of standardization. Therefore all participants were asked seven questions that remained fruitful throughout. The remaining forty-eight questions were each posed to fewer than 46 participants[5].

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[4] Please see participant demographics at:
http://denvernixon.net/ThruTheWindshield/ThroughTheWindshield.htm
[5] Please see interview question timeline at:
http://denvernixon.net/ThruTheWindshield/ThroughTheWindshield.htm

Interview and commute narrative transcripts were analyzed through multiple comparative readings and interpretive, focused coding using NVivo and marginalia. The GIS data did not play a large role in the material presented in this article, so spatial analysis methods are not described. Participant quotes are followed by the participant number and A, C, M, or P representing automobile driver, cyclist, motorcyclist or pedestrian, respectively. "CN" denotes a commute narrative quote, and "FUI" represents a follow-up interview.

Environmental Connection and Flame Throwers

Thirty-four participants used more than one mode. They were asked whether they perceived a difference in the connection they felt to their social or physical environment, depending upon their mode. A large majority claimed that the active modes were indeed more connected. Walking was perceived as the most connected, cycling the second most connected, and public transit or driving the least.

> Walking is, I mean, you connect much more with, you know, nature, with people, with, you know, the environment, the sun, the—absolutely everything. You can take in so much more than, well, I don't cycle so I'm not speaking cycling but driving for sure [280P]

> Oh I feel a greater connection, I guess, biking. Because I think, more so when I'm in Lynn Valley, because there's times where I stop and then I see people on the sidewalk that I might know, and you could say 'hi' or... just kind of more aware of what your surroundings are when you're going twenty-five kilometers versus sixty kilometers. So, you tend to kind of pick up on things more.... So I do feel more connected on the two wheels than on the four [347C]

All of these participants explained the greater sense of connection they feel when walking or cycling than when driving, and of being able to "take in" or "pick up on" more using these modes. In this respect the active modes could be said to develop a more "receptive" stance toward one's environment, aided in part by the differences in speed and absence of carapace. 347C spoke of stopping and chatting; Demerath and Levinger call this "pausability" which is: "a combination of the ease of interrupting an activity and the ease of resuming that initial activity. Pausing is far more convenient for the pedestrian than it is for the automobile driver (or even the bicyclist)" (Demerath and Levinger 2003:230).

Twelve pedestrians who also drove or cycled shared these sentiments, some very emphatically. Three pedestrians were ambivalent. They suggested that there were similarities with respect to the quantity of information absorbed, but that differences occurred in terms of scale or type of environment. The responses of thirteen multi-modal cyclists also shared the sentiments of those quoted above. One cyclist, however, distinguished between what they felt was an increased *observance* or *awareness* when cycling (*versus* driving) as compared with actual *connectedness*. Future research may benefit by exploring the difference between awareness and sense of connection. Only six drivers used multiple modes. Four felt more connected when cycling or walking:

> Your bike connects you to the environment. Driving a car connects you to the environment almost like a fucking flame-thrower [136A]

An irresolute driver had only the Skytrain, another encapsulated mode, to compare driving with, and another driver made a similar point as that stated by the ambivalent pedestrians: the ways and scope in which they noticed things were different, but not necessarily the degree or depth to which they noticed. This difference in scope, rather than "resolution", is precisely the distinction, discussed earlier, between hybridity with the car versus the environment through which the car plunges. In addition to the steel encapsulation, the time-space discord or arrhythmia between the driver and passing environment changes the scope of awareness, and as discussed above is thus also a form of encapsulation.

Some participants switched their predominant mode at some point in their life. When 372C changed jobs and switched from driving to walking and cycling she felt much more socially connected:

> I don't know how to say it in the positive way of saying it. But I know when I had the car, I felt much more... I felt kind of shut-down in a way. And I guess socially disconnected. You know, when I'm riding my bike or when I'm walking, I'm always interacting with people… when I'm walking or when I'm on the bike, I'm acknowledging other cyclists or I'm saying 'hi' to someone I know or when I'm walking I'll talk to someone and their dog about their dog. That kind of thing. There's a better opportunity to be socially connected even if it's an impermanent, no-commitment-required kind of thing—there's just the connection [372C]

This participant was not prompted with the phrase "socially disconnected" or one like it, but rather volunteered the term. Her last statement regarding social connection without

commitment was curious; does this suggest an absence of solidarity, or simply the ease that comes with a lack of expectations?

A number of participants discussed their sense of isolation when commuting by motor vehicle. 395P spoke of the draw to isolate as a result of being a former alcoholic; they described the vehicle as the perfect medium for achieving this when commuting and compared it to walking or catching the bus:

> Oh, definitely engaged with walking, or public transit, and, very isolated, in a vehicle. So that's another way that walking is a very positive influence on my wellbeing, because as an alcoholic, my tendency is to isolate. So, when I had a car, you know, you don't have to talk to anybody, right? [395P]

Therefore, this participant felt the need to resist the temptation of isolation found in the encapsulation of automobility. One cyclist described this encapsulation as a "framing" of privacy:

> So, there's a whole philosophical thing about space. So the difference between people who ride to work and people who drive to work…. It's like the difference between people who watch TV and people who don't. Like there's people who live in a world that has a frame around it. So watching television, driving a car—those are activities where your world has a frame. And so you're... there's you're little world—you don't want it disturbed. I think that's why those kind of people are more impatient. And when you ride on a bicycle, you don't have... your world's not in a frame. You have a panoramic view of what's going on [104C]

This view of television and driving as framed reality echoes De Cauter's (2004) aforementioned view of the capsular nature of common screens, as well as Sennett's suggestion that: "the traveler [who uses modern technologies of mobility], like the television viewer, experiences the world in narcotic terms" (1994:18). When comparing driving and cycling, this participant too noted the difference between isolation and community connection, not to mention a differentiation between experiences:

> The car, you're completely isolated. You can turn on the radio, you don't have to talk to anyone, you don't have to see anything. You just drive on the highway, too. So you're not really experiencing; all you're experiencing is other people driving, when you go down Highway One. When you go through people's neighbourhoods, you see those communities where they live, and how they live, and the challenges they face or the beautiful areas they live in, you really... it's what you're left with, that mental residue [139C]

The last phrase, "mental residue," suggests the accretion of a particular kind of knowledge, perhaps tacit (Polanyi 1966) or otherwise. After countless commutes by a particular technological practice this accreted residue may shape subsequent practice.

It is clear that these participants view isolation negatively; however, as expressed in the mobilities literature, a few interviews here, and conversations outside of this research, for many the car is seen as a refuge where one may find some alone time, "alone time that is seen as unselfish and cannot be contested" (Lutz and Luz-Fernandex 2010:145; see also marketing research report by Edmondson 1998). This desire for privacy is one explanation for the general failure of car-pool campaigns (Ferguson 1997), as can be seen in this participant's thoughts on the matter:

> I like... I thought about doing the carpool thing. But I like the flexibility of just going when I want to go and arriving when I want to arrive. And I do like having my own space. So I'm a bit conflicted…
> *I: Can you say anything else about that in terms of your own space?*
> I can listen to the music I want or the radio or... I don't have to talk to anybody if I don't want to. A lot of my job can be listening to people complain about their jobs. And so I... it's nice to just not have to talk and just… So it's kind of the downtime. [832A]

Whereas a desire for privacy is certainly understandable, the question remains as to whether this desire is a self-reinforcing feedback loop; as discussed earlier, increased privacy, i.e. isolation, may increase fear by expanding the unknown, leading to further desire for privacy. Similarly, we might ask whether this "downtime" displaces valuable community face-time.

Familiar People, Famous Commuters

The preceding interview question regarding multi-mode users' sense of connection intentionally remained broad and open ended to encourage participants to share their own associations. To gather a more specific sense of the social engagement with which commuters travelled, all participants were asked: "are there people you regularly recognize during your commute because you see them a lot? Do you speak to them? How do you feel about them?" Fourteen pedestrians recognized people and five spoke with them:

> I usually say good morning. Usually don't say much. Maybe a little bit—"nice day today", or "isn't this a grand morning" or something like that [751P]

This particular participant knew details about these people:

> Walked by a street person there in the doorway. At least they're awake this morning. Usually they're asleep [751P_CN]

Fourteen cyclists recognized people and six spoke with them:

> Usually it's the street people… and I'm on hello terms with them. "Hi!" [laughs] [618C]

Eight drivers recognized people or vehicles—three specifically recognized the automobiles rather than the drivers—and three communicated with people outside their own vehicle:

> I think there's a couple of cars I recognize. I think there's a Corolla and something else that zips along about the same time as I do [574A]

Approximately half as many drivers recognized and communicated with their fellow commuters as did pedestrians and cyclists. This finding merits further exploration.

Several pedestrians found it odd that they recognize or "know" people on their commute but never acknowledge or communicate with them:

> It does strike me odd that you can walk for years and see people daily with no recognition. And that seems kind of weird, that there's a conscious attempt to ignore and not have any kind of recognition. So, yeah, that's kind of odd [239P]

> I'm getting to the point where I'm staring at the people going—"look at me! We're human beings!" [428P]

> Yeah, well you'll hear me talk about them. There are people that I see pretty much every day on my commute. And we never even smile at each other. It's sort of funny. Yeah there's about four people that I see. Four people in the morning. I've yet to have an exchange of any sort [975P]

These people were familiar to the participants, but acknowledgement or communication never occurred and the 'relationship', never moved beyond this. Whether this silent, intentionally non-communicative, recognition is bonding or alienating is difficult to affirm. Clearly those quoted feel a certain discomfort or even estrangement from what they feel is the oddity of these situations, but as discussed in the introduction,

communication is not imperative to solidarity, and discomfort with the situation is not the same as estrangement from the people themselves.

Some pedestrians spoke of developing an attachment to those they recognized despite the absence of communication or solid feeling of 'knowing':

> You get to recognize certain people that you see coming in the opposite direction generally, and yet you never really get to know them. I mean, there's even a few people who will smile and wave at me as we pass each other, but no idea who each other is or what we do or anything. So it's kind of like an anonymous acquaintanceship in a way [893P]

The preceding confirms the game theory finding that simple recognition or non-verbal acknowledgement alone may inspire a sense of connection (Bohnet and Frey 1999:53). Active mode users' multiple expressions of concern regarding the absence of familiar, but so far un-introduced or unacknowledged people further demonstrated this attachment:

> I get worried when I don't see people… You know like, I do, I kind of think, oh I wonder what happened. So you do kind of have this attachment to people even though you don't talk to them [492P]

> If I don't see them I wonder why. Yeah, you know, it's like, oh where's so-and-so? Where's the man with the poodle this morning? [751P]

> If they weren't there, I'd probably, or if one of them wasn't there, be a little bit worried, whether something's happened to one of them [825P]

The latter participant did in fact mention such a case during their commute:

> So the past few weeks there's been a guy sleeping on the bench in the mornings here, he looks quite new to being homeless, but he's not there this morning. I hope he's okay [825P_CN]

For 825P concern also extended to the animals she encountered during her walk, reflecting the tendency for senses of connection and relationships to go beyond only those between humans.

Sometimes familiar commuters would acknowledge one or the other in chance encounters outside the commuting context:

> There's one guy in particular that I noticed every day for a year. And we're always going in the opposite direction—kind of in a hurry to go to work. But then I saw him at critical mass, and we just had a long conversation. I'm like 'I see you all the time. Where do you go?' [911C]

Positive communication, such as this, outside of the commute space, suggests that a tacit solidarity or empathy may be formed through recognition or common practice.

Several active modes users were verbally greeted outside of the commute environment by those who recognized them but who they did not recognize. For instance, 774P had people approach her, both on a remote hiking trip and in new workplaces, to tell her that they recognized her from her commute and/or around town. In most cases those who approached these participants were unfamiliar drivers:

> I've been in situations where I've had people come up to me and tell me they recognize me from seeing me on the bridge every day. And they always tell me how envious they are that I'm walking and they're driving… And I'm going, sorry I've never seen you… Lots of times people are honking their horns and I never do find out who it was, and I just kind of wave at everybody who acknowledges me [774P]

> …I don't pay attention to people honking and stuff like that and people have said to me, you know, "I saw you, I see you everywhere in Vancouver, for god sake, you walk so much… And you know we honked and we honked and we never get any attention" [943P]

I call these participants who have unfamiliar people approach them "famous commuters". They are familiar to others; but not all of these others are familiar to them. Are they thus connected to their environments, and integrated in their communities? Are the drivers who see them but are not recognized by them integrated into *their* communities? This reflects the asymmetrical communication and relationships between a driver, other drivers, and other mode users discussed earlier. Compared to active modes, the shell and speed of the automobile renders mutual recognition and communication difficult:

> Yeah, there's some runners and that, that you see regularly on the bridge. Cars, no. I don't really. They're just a big blur usually [217C]

As noted earlier, De Cauter highlights the detriment of speed to perception. Adams similarly suggests that cyclists and pedestrians arguably see the world at a "higher level of resolution than those moving ten times faster" (2004:35), and Demerath and Levinger argue that "the pausability of travel would appear to be inversely related to its average speed, and to the human energy required to reach it (partly why bicyclists tend to

roll through stop signs with such great frequency[6])" (2003:230). Are the places and people experienced at different speeds different places and people? Here the participant's quote reflects an arrhythmia, rather than simply an issue with absolute speed (Freund and Martin 2007; Lefebvre 2004; Nixon Forthcoming; Spinney 2004). There is an irony in the way this arrhythmic, asymmetrical relation renders the observers, *versus* the observed, arguably less connected.

Several cyclists spoke of a sense of community with other riders and a concern that led them to assist when necessary:

> Especially with other cyclists there's a sense of community [627C]

> [I] ask them about whether they're okay, whether they have the tools they need [227C]

> You say 'hi' to cyclists. I didn't have an instance this time around, but quite often somebody's got a flat tire on the causeway and I'll stop to make sure at least they have whatever they need. Because I carry a little patch kit, and tire levers and a pump [347C]

Quotes such as these suggest, albeit tentatively, that a sense of community, as developed through familiarity and *shared practice*, motivates cooperative action. Do the cyclists thus possess a "mechanical solidarity"? Drivers too are known to stop and help other drivers, but this was not mentioned by the participants.

Driver descriptions of recognition were sparse and lacking expressions of attachment, with the exception of this participant who was also a cyclist:

> Yeah, I like seeing people. I'm a people person. These are people in my world. I think it's nice to recognize people [136A]

Rather, many drivers were ambivalent about the familiar people and/or vehicles:

> When you go at a certain time, you will see certain vehicles. You know that those vehicles there… you know… you recognize the vehicle being a good driver or a bad driver. [153A]

> Well the squeegee guys… I really wish they would just stay away. The guy on the corner of Second… I feel really badly for him and he looks like he's got a nice face, and he doesn't look like he's a drug addict… [384A]

[6] This does not completely explain, however, why an almost equal number of drivers also roll through stop signs. See Nixon (Forthcoming) for discussion of stop signs and behavioural energy conservation.

The aforementioned famous pedestrians were observed and considered familiar by drivers passing by, and so some drivers must have positive recognitions during their commute. However, these types of stories were not prevalent during the interviews, so perhaps the number, degree, or qualities of these recognitions are different for drivers than the active modes. It did seem that many motor vehicle users struggled with their positive and negative thoughts and judgements while commuting, such as this participant:

> The other things that are memorable are the times when I've been really angry in traffic. So there was an incident… this guy trying to turn out of an alley across four lanes of traffic and a solid yellow line. *I was so angry*. I was just swearing out the window at him. Just unapologetic. This is when I had a car. And afterwards I was like, you know, this is not the person I want to be [431M]

Another driving participant complained that their commute recordings were significantly more negative than their interviews, and that they felt embarrassed and frustrated by that.

These comments, and the difference in tone between some drivers' commute narrative and interview data suggests that the act of driving, and the personality it brings out, may conflict with the participants' normal, or desired, self-concept and identity. Michael paraphrases what he sees as a common mini-narrative in road ragers' accounts: "when I get behind the wheel of a car, I am a completely different person" (2001:74). Perhaps revealingly, in the commute narratives drivers used the word "hate" approximately five times more than cyclists or pedestrians, who used "love" approximately two and three times more, respectively, than drivers. A number of drivers and multi-modal active commuters compared the pleasure of the automobile road trip to the misery of commuting by car, an affective distinction perhaps owed to the differences in volition and control, the difference in repetition and thus stimulation of novelty, and/or the destination—work *versus* leisure. Freund and Martin suggest that: "while driving a car can be a pleasurable activity for many people, it is usually so in the context of being a voluntary act, such as taking a traditional Sunday excursion into the countryside" (2007:41). But during commutes, 513A contended: "it's just something about being in a car, it just makes people want to get somewhere faster than the other person." Does this reflect the proposition, discussed earlier, that the social contract and sense of egalitarianism are attenuated by the commute assemblage of car-driver hybrids?

One driver did speak of the camaraderie sometimes felt between drivers of particular makes or models of vehicles:

> A wave is your way of contact and I own a Saab… And in Saabs, if you wave to another Saab, that's like immediately you're in the family… And it was funny, but just a wave... I think it's one of... it's funny, it's one of... it's like ice-cream. Everybody loves ice-cream. If you wave... if you know somebody, and you wave to them in the car, it's like they turn six. It's sort of like, oh. It's funny… It's a nice feeling. There's a... you belong or something... [843A]

This belonging, then, is to a brand rather than modal community. This may be owed to the automobile normative; in contrast with alternative modes, there are few other opportunities to differentiate oneself and those committed to the same experience, and the ability of automobile brands to articulate identity is limited compared to that of clothing, words, or physical deportment (Demerath and Levinger 2003). Regardless, cyclist community or camaraderie seems based more on shared practice, whereas for drivers it may or may not be based on a shared symbol or commercial product. Not all cars are alike, and different brands and models may be seen as altogether different technologies. In this sense, and with respect to the hybrid concept, different brands could be seen as different hybrids (Michael 2001) and practices, although compared to other modes the difference is not as great.

Interactions, Also Known As Conflict

In the interest of querying beyond potentially "passive" recognition and to better identify intermodal social relations all but two participants were asked to elaborate on whether "any significant interactions occur with other modes?" The type of interaction—physical or verbal, good or bad—was not specified so participants could go where they wanted with their answers. No other question provoked such strong and often negative responses. A number of pedestrians were critical of drivers who ignored them, particularly in intersections, leaving the participants to fend for themselves:

> Well, as a pedestrian, you're really quite aware of how people drive around corners. You know, how some people don't really come to a stop before turning right… I have to be very conscious of drivers turning left [975P]

One pedestrian passionately described a self-centeredness she saw in some drivers that led her to feel herself not only at the bottom of the transportation hierarchy, but outside commuting society itself:

> I think it's-- they're totally focused on "me", the ones on the phones, the one—"I'm going wherever". I mean, I don't know what their distraction is but they're not focused on their driving [laughs] obviously. And, again, it's just, like I said, sort of more 'me' focused and so the poor pedestrian on the side of the road is, like, secondary, third, you know… Well, again, I'm going to work, you're going to work. But how long do I have to wait before I get to cross the street? And I can't just plow through 'cause my safety's in jeopardy. You can just plow through 'cause I'm not going to hurt your car unless I stick out my umbrella and make a big scratch down the side of it, you know. That's the only, you know, sort of, in my mind, that's the only retaliation I get, you know. So it's totally frustrating because it's, like, the pedestrian is, is not part of the commuting society [280P]

Both the statement about pedestrians' secondary or tertiary status, and the last line—exclusion from commuting society—clearly reveal a sense of social alienation. In this might-is-right context the participant feels disempowered and thus provoked to fight back with her umbrella, as did this driver when regularly walking:

> I used to suffer from pedestrian rage… I would hit people's cars, with my hand or with my umbrella. And I would shout at people, profanely. Because as pedestrians, look, if there's an accident between two cars, yes it can be big, but if there's an accident between a pedestrian and a car… [501A]

This pedestrian was in fact hit by a driver clearly in the wrong (as described by the participant):

> I actually got hit by a car… a woman was coming up from the beach and turning left and she basically just drove into me. And I was off work actually quite a while… she was very defensive. She thought we should have the same laws here they have in New York where pedestrians have no rights and she, of course, was saying I'd gone after the light had changed. And I know for sure I hadn't [774P]

However, the participant then went on to defend the driver and criticize her own actions:

> So I think that just taught me to be even more careful. I like to think I was pretty careful before. And that made me even more nervous about driving because I just saw how… Just a mistake she made… But maybe if I had a lighter jacket on, maybe it would have been easier for her [774P]

Is this a form of "false consciousness", whereby the alienated pedestrian internalized their low position in the transportation hierarchy and blamed herself, the victim? Regardless, this particular story does suggest that empathy between mode users is possible, and this theme is discussed further below.

Several pedestrians similarly criticized the riding practices of a reckless contingent of cyclists:

> Sometimes I have to like kind of jump out of the way, with vehicles, or with bicycles as well… my peeve with cyclists is that they don't follow the rules of the road [395P]

> There are some very polite and respectful cyclists out there. And there are some who just are so aggressive, and just… I don't think they care for the safety of people [492P]

The first participant frames this as a problem with cyclists generally; such totalizaing language was relatively common in the interviews, and reflects the way in which an entire identifiable group—in this case a mode—may be "othered" and ascribed characteristics in an unrealistically homogenous way. Horton (2007), and Skinner and Rosen (2007) discuss such stereotypes, as perpetuated by both non-cyclists and cyclists, and conclude that these are formed in contexts wider than mobility practices and culturally perpetuated. The second participant quoted took a more specific approach, though this division into two—good and bad—is still suspect. Regardless, these stories further stress pedestrian's sense of existing at the bottom of the hierarchy of a might-is-right transportation system.

Some cyclists shared horrific stories of negligence or intentional abuse by drivers, such as reckless driving, being sworn at, and having things thrown at them. The following three interview excerpts exemplify these interactions:

> Definitely drivers, like, you get yelled at. Sometimes. Or honked at. Or whatever… It's like, angry motorists, I think that's the gist of it [767C]

> I would say the most encounters are the motorists. You know, and there's all sorts of you know, specific types. You know, there's the kind that race up to the stop sign. And when they pull over, if you don't pull over you're going to get hit. Or by the same token they race to beat you to the roundabout. That's another one that happens. Yeah. And then just people running stop signs, running red lights… Door opening. That hasn't happened in a while, but mind you that's why I ride a door length out into the lane. So when these people throw their door open it's like OK. I would

> say percentage-wise motorists are the most… I would say probably 80%. 15% pedestrians, 5% other cyclists [993C]

> Oh, I was afraid the guy could hit me after, he could just lose it and hit me with his car.
> *I: But what gives you that feeling? Why do you worry?*
> Because I've gotten yelled at by people, saying, "get the hell off the road!" "What are you doing?" And also I've gotten, like where I'm supposed to be riding… And there's like four lanes. I'm riding in the far right lane, close to the curb. And get someone come up and roll their window down at me and yell at me to "get off the fucking road." And that's where I'm supposed to be… I've been hit by beer cans, full beer cans. Because somebody thinks it's funny to ride along and throw something at you, when you're a cyclist. I got hit by, riding in the summer in Chilliwack, and people came by me and I got hit by like a fudgesicle… I guess, more, people will cut you off. And I've had this experience, and you'll knock on their window and right away they're tearing into you. So you know that the road rage is there. It's not like you can talk to somebody reasonably. Already they're just like, Rrrrrr. They're angry and that… they just start yelling at you. And like I said with that lady the other day… She's beeping me when I'm stopping for a four way stop [217C]

Dominant themes here include road rage and fear. Motorist anger manifests in might-is-right aggression and coercion which instills a sense of fear in the cyclists. Also notable is the conflict cyclists feel with respect to their use of space. If they ride on the road they're legally in the right but some drivers will aggressively challenge this, particularly if they're too far into the lane; but if they ride too far to the right they risk "getting doored" and sidewalk travel may attract a fine. Also, 993C's experience with drivers unsuccessfully racing them to stops and traffic circles is a product of the aforementioned arrhythmia of the two modes. In this case the drivers' acceleration and deceleration is more staccato than that of the cyclists. These conflicts are a product of legal and cultural contradictions and misinformation in dire need of rectification if cycling is to be encouraged and its social benefits maximized. They may also possess spatial unevenness, according to 767C, who suggested that driver hostility was worse in the suburbs than downtown. He attributed this to the familiarity of cyclists to downtown drivers, and the fact that urban cyclists can outpace cars and thus physically escape aggression.

Much as with the pedestrians, these interactions sometimes left cyclists with a clear sense of un-belonging:

> Another night, at Oak and 10th, when I was waiting at the intersection to go, three cars in a row, I had a right of way to go straight, turned left in front of me, and it was one after another, and it was like, am I not here? It was like they literally did not see me at all, and I was lit up.
> *I: Do you think they didn't see you or they just ignored you?*
> I think they ignored me, for sure. I mean for three cars in a row to do that, that's kind of weird. It happened on 10th with a woman exiting the hospital… She was on her phone, and she was talking, and yeah, she literally did not see me. She had no eye contact, nothing, it was like I didn't exist. [981C]

Looking is often distinguished from seeing; the latter implies noticing and recognition. To ignore something usually implies some sort of volition. In a commute environment where automobiles demand the most attention owing to their size and speed, commuters' cognitive capacity is largely filled noticing cars (Hole 2007; Øvergård et al. 2008; Spence and Read 2003; Strayer and Drews 2007), not pedestrians or cyclists. So, despite "looking" the active modes may be missed by drivers, the same way most viewers of the popular UK traffic safety advertisement miss the interloping "bear".[7] Whether individual drivers intentionally ignore cyclists is subject to one's expectations of driver responsibility, but the transportation system itself—including space allocation, speed limits, mode split, laws and punishment, and the actual car—may be seen as fostering driver ignore-ance to the presence of active mode users.

Do these types of interaction cultivate social alienation? It is difficult to imagine that this exclusion from commuting society (280P) and "not existing" (981C) would not impact a person's sense of worth, as discussed above with respect to symbolic interactionism. This alienation may also then contribute to a transportation status syndrome that undermines active commuter's health. Commuters' responses to queries directly related to alienation are discussed below.

> Some cyclists were assertively communicative in their fight for space on the road:
>
> Well, I guess the significant would be the negative interaction with motorists sometimes… It's not where I want to put my energy and I don't want to let that affect me too much. But sometimes, you know, my adrenaline is going, I'll chase down a motorist and tell them what they did wrong [911C]

[7] This video, based on a laboratory experiment using a "gorilla" (Simons & Chabris 1999), was originally located at Transport for London's dothetest.co.uk, but the site is now offline. There is a fan site that now archives the Do The Test campaign videos here: http://www.awarenesstest.co.uk

> Sometimes I've told people to... you know... that I instructed them that I, in fact, did have the right to use that lane when they were talking at me. Mostly drivers. Yep. It really pisses me off when I'm already speeding and they're trying to... or they're coming up to the red light and they've decided that they want to be exactly where I am. And it's like... law of physics, man. We both can't occupy by the same space [laughs]. But that's usually what it is. It's just angry stuff when other people are being jerks and I have to tell them about it. That's mostly it. Other cyclists sometimes. My interactions are usually blowing on my whistle to just warn people that I'm coming and you better not move. Yeah. [722C]

> I'll chase down a car [on a bike] if the opportunity is there. I'll make the driver roll down their window so I can let them know that they almost hit me or that they've cut me off or that I had the right of way somewhere whether or not it was a close call… the horn is overused on a car, definitely… it's such a jarring sound [677P]

These active mode users experience the same frustration mentioned by Katz, but use verbal communication or whistles (like horns) to express the injustice. Is this a product of their mode? As seen in 722C's and 993C's quotes, the tendency of some drivers to aggressively overtake and displace despite immanent stops, red lights, and traffic circles was a common theme of irritation and conflict for cyclists. The cyclists in this study did refer to conflict with other cyclists, but as exemplified in 993C's quote, most suggested that this was a minority of the incidents. This finding tempers Skinner and Rosen's research that found cyclists to be most critical of other cyclists (2007).

Drivers were irritated with the mobility practices of pedestrians and cyclists, as well as other drivers and even "squeegee kids":

> No, I would say probably most likely pedestrians because they are ignorant people, more than anything. They think, oh it's a crosswalk and it's mine now. You see me or you don't see me, it doesn't matter. That's the attitude they have, which is not good. They don't look before they cross, they don't look to the left or to the right or ahead of them. They just walk. And that's a big, big problem. That's why people get killed—because they think they own the road at that point. [153A]

> I get very angry when the pedestrian, they won't try to make an eye contact. And like, you know, although as a pedestrian they have the right of way, they sometimes, a lot of times they misuse it, you know. And I hate it, you know. They would like go very slowly in their own world, you know [523A]

> Cyclists... interactions with cyclists that seem to forget that eighteen inches of the road is theirs, where they're riding two-by-two or three-by-three down the road. [384A]

> One of those squeegee guys tried to clean my car and I told him 'no', and then I got really mad, so I honked the horn—on the horn—and he got scared and backed off... Oh there was another time I was driving, legally in the HOV lane and another car... the car behind me—it looked like it was a single person—kept trying to pass me and was driving aggressively, so I slowed down to make him upset. And then I sped up, because he was driving too close to my car. Anyways, that didn't work [322A]

A major theme in the first three quotes is the sense of injustice in response to active mode users' failure to follow, or at least follow the spirit of, what these participants believe are the rules. Participant 384A's comments, beyond their spuriousness,[8] beg the justice related question of *why* cyclists are allegedly allocated only eighteen inches of the road, whereas automobiles are granted at minimum 130 inches in the City of Vancouver. Economist's research into transportation budgets reveal that it has little to do with who pays for roads, given that cyclists most often subsidize drivers through property taxes (Litman 2002). Demerath and Levinger (2003) argue that the creative act of walking encourages practices that establish shared meaning rather than rule following; thus interpreting pedestrians as rule-breakers is "to treat them as drivers on foot" (231).

322A attempted to deal with her irritating interactions with those around her through physical means facilitated by the automobile.

> Drivers also sometimes received verbal abuse, in this case from a pedestrian:
>
> The pedestrians who get mad at you are usually the ones who aren't in the crosswalk. I had one guy get mad at me, and swearing and yelling at me… I want to go, and this guy is not in the intersection and I'm trying to go forward slowly just to see around the corner. And he steps up, and I lurch and stop. "You mother fucker" and he starts swearing and cursing at me, and it was like, you know on a good day I would drop you right now [425A]

The animosity described here is rooted in the physical dissonance and arrhythmia between mode pratices that manifests communication assymetry, use of space conflicts,

[8] In Vancouver most painted bike lanes are 70 inches wide and according to the BC Motor Vehicle Act cyclists have the right to take an entire lane if it is the only safe option.

and trajectory counteractions that are aggravated by physical power imbalances, and, perceptual differences with respect to interpretations of mobility rights, associated senses of the transportation hierarchy, and stereotyped and often ignorant views of other mode practices. However, a number of participants were humble about their position in the transportation hierarchy and otherwise quite generous toward the other modes. There is a tension then, whereby some commuters feel both negative and hostile and yet positive and forgiving toward the others they interact with. They may feel both sentiments. This leads me to suspect that the antipathy both produces, and is a product of, alienation.

Alienation or…

As discussed in the literature review, for the purposes of this article alienation may be thought of as the inverse of connection. If a car connects one to their environment "like a flame thrower" does it in fact alienate? Are those outside the car alienated? Is this the best term to describe what the participants and the literature are attempting to identify?

For the first twenty-seven interviews participants were not asked directly about their sense of alienation for fear of biasing their feedback. After this the idea was explicated in a question near the end of each interview—"does your commute ever leave you feeling alienated or displaced?"—in order to check the fit of the term and its connotations directly. Participants were not asked to focus on a particular type of alienation. The results were mixed. Pedestrians most often began their answers with, "no, but…" followed by a list of exceptions such as physical threats (crosswalk risks, getting pushed, getting run over), or societal dissonance (different work schedule, possessing a mood while walking that seems to conflict with the surrounding public). One pedestrian suggested that *drivers* are probably alienated (677P). Four cyclists answered no, and one each claimed sometimes, sort-of, or yes. Some preferred the term "marginalization" or "injustice" versus, or alongside, alienation:

> We talked about being marginalized before. It's not alienation. It's not like I'm the other, that I'm different, or that I don't belong completely… I guess alienation in some ways kind of makes sense because it's estranged them to see a cyclist… it's the rare and random things where there's a threat [722C]

This cyclist's comments reflects De Cauter's and Putnam's view on difference and fear, whereby the isolation of the automobile system renders other modes unfamiliar.

In contrast with the active mode users, half of the drivers unhesitatingly claimed to feel alienated. Four felt alienated in their cars, and two felt that other car drivers must be alienated. One driver preferred the other term used in the question:

> There's sort of… just maybe just displaced. Hmm… maybe occasionally, just because you're just in your little pocket in your vehicle, secluded from everything, travelling along [832A-FUI]

This participant too emphasizes the encapsulation and isolation of the car.

Some of the active mode users who agreed that they felt alienated offered strong statements. A pedestrian and cyclist quoted in the previous section claimed that:

> I feel like I'm the lowest of the low or non-existent sometimes [280P]

> Yes [I do feel alienated], in the sense that it's like, I can't win… maybe I don't belong in this world here… It's just that nobody wants a cyclist around. In that sense. Just, go away [993C]

Some found particular mobility spaces and social contexts alienating:

> Well, sometimes, I suppose, like if I'm in an area that hasn't been designed very well to accommodate bicycles, if I'm in an area that's designed more for cars than anything else, yeah, then I can feel a little alienated and displaced… If it's a particularly narrow street with a lot of parked cars, and I'm trying to navigate it, I feel like I'm in the way, even though technically we are part of the traffic… or if you look at businesses that have tonnes of parking that is designed for cars, that have no bicycle parking, yeah, you feel very much, okay, I'm not part of this equation… Sometimes with my friends when they're talking about driving, and they're talking about cars and gas, and the politics around, you know, getting around in a vehicle. Sometimes I feel a little bit alienated in those conversations because I'll find myself trying to be very careful not to talk about cycling too much, because that tends to raise a certain irritation factor for them [981C]

When surrounded by those who do not cycle, this participant must censor her talk about cycling issues, such as the inadequate provision of lock-up facilities, because of their unpopularity as topics. Is this a reflection of only knowing the transportation hierarchy from outside the car?

Some of these and other active commuters claimed that the public perception of their modes as healthy and environmentally friendly actually improved their sense of

status. This sense was most often reinforced through symbolic interaction in social gatherings outside of the commute, though some of these participants carried this positive identity with them into the commute environment. However, in talking about what were essentially mixed messages received in different environments (e.g. workplace versus commute), cyclists and pedestrians inadvertently expressed some degree of identity crisis or role conflict. Their status in the minds of others could be high or low depending upon what type of bike they were riding, what clothes they were wearing, where they were riding or walking, with whom they interacted, and the context of that interaction:

> I think that motorists would probably see me as a lower status than them, because they tend to—big generalization—but they tend to think they have more right to the road than anybody else. But I think, I mean, I think cyclists and pedestrians, in my mind, are equal. Again, yeah, I just think they should have priority over cars as well.
> *I: How come?*
> Well, because for one, they're more vulnerable to everything. Being hit by a car, weather conditions and it takes… us, longer to get everywhere [677P]

> Most motorists… [have] a real lack of seeing cyclists as being… well certainly not equal to motorists. Absolutely not [993C]

> It's interesting because I think when John Q. Public is driving his car at five o'clock on his way home in the rain and sees a cyclist, he's going "[makes a grumbling noise] bloody cyclist get out of my way". But when the same person comes to see me in my office and I've seen him in emergency, done the consult, followed them in the hospital, then the surgery, then they're back to get their stitches out or their cast changed or their referral to physio, and I'm in my cycling outfit, they go, "oh wow that's really good, you look after yourself." You know? How someone perceives you as a, in quotes, "cyclist" depends upon the situation they see you in when you're the cyclist as well. It's very much in context [104C]

But pride in the active modes was revealed in several stories of active commuters turning down rides from driving friends and coworkers, even when the walk or ride ahead involved rain, darkness, or long distances. The average social status of the sample with respect to occupation and education appeared higher than average, and so this may also have had a buffering effect on commute interactions that would have otherwise undermined their sense of status.

One driver quoted earlier who had done considerable cycling contrasted the two mobility practices in terms of their sociality and echoed the idea of encapsulation or containment:

> There is an alienation of being in a car, because again, you're in a container… When you pull up to a light [on a bike] next to a bicyclist, there is a probability that you're going to chat with that person. When you pull up next to someone at a light in a car, unless you're on the hustle, you're not going to be chatting with them. You know. Unless you're 17 and it's a 16 year old girl. But other than that, you're not going to have any interaction, really, other than maybe, you know, a furtive glance. So anyways, that's part of the alienation. It's how you talk to people [136A]

Because, for active mode users especially, "alienation" was a less preferred term than others like marginalization, later in the interview process five pedestrians, four cyclists and two drivers were asked about their sense of injustice. Most respondents agreed that they felt certain situations unjust, this injustice originating almost exclusively from automobility. These women both described how careless driver behaviour conjured a sense of injustice that manifested aggressive backlash from pedestrians:

> Yeah, and it goes back to the car… I mean, that sense of, you know, going to cross the street when cars just cut you off. They see you, but they cut you off or when you feel like—if I'm biking between—on Hemlock between 12th or 10th and 7th, all of the cars are so close to the curb and there's just—they don't make room. They don't make room for anybody else.
> *I: How does it make you feel, getting cut off, in terms of injustice?*
> Angry, it makes me very angry and I don't react very well… Sometimes I'll purposely walk out in front and I'll make them stop. I can be a bit of an aggressive pedestrian, because I think that they need to be made aware that they're doing something wrong and most people will not—I mean, most people just let them go and make concessions for the car to go first. I don't think that's right [677P]

> There could be a woman with kids and a stroller, pouring rain…. And the cars just rush to get to that red light. And there's people standing there. Lots of times it's not just me—there's lots of people—and it's pouring. And they just have no clue. They pay no attention whatsoever. And they're driving down the street like they're on a freeway somewhere and it's a neighbourhood. There's kids in the neighbourhood, there's people crossing the street. And it's sort of... it's our neighbourhood. The cars are coming through—it's our neighbourhood, not yours… They're on the cell phone, the light, the hand signal goes up, people get to go across the street and some idiot comes [makes zooming sound] right through. I saw a guy,

> out of a group of people crossing the street, kicking the door with everything he had because that guy almost killed quite a few people in the intersection all in one shot. The hand signal was up [943P]

This cyclist conveyed a sense of injustice in the contradiction between traffic law, and common driver misinterpretations of that law that led to aggressive action:

> Yeah, there's definitely times when you can tell that the cars around you don't really think you should be where you are. Like the one place you notice it a lot is, you're making left turns… but you're in the left lane and you're waiting while there' s green light and people just wait behind you or go around you. Usually it's like not an issue if you're in a car, but you do exact same thing [on a bike] and people honk their asses off, like "oh, what are you doing blocking the traffic lane?" It's like, "um, I'm making a left turn, exactly like a car would be in the exact same situation." Like people just don't get it.
> *I: How does that make you feel?*
> Um, pissed off, I guess [767C]

217C felt that the general call for more cyclists in a context where the politicians and public are unwilling to give up automobile space is both paradoxical and unjust. 395P and 217C both suggested that blocking sidewalks and bike routes with construction fences and machinery, while simultaneously providing through-ways for automobiles is unjust. Interestingly, 893P claimed that they did not suffer any injustices because they had chosen to take the slowest form of mobility. With respect to fairness and law, this appears similar to 774P's victim blaming, whereby a pedestrians cannot suffer an injustice because they chose to walk. This view not only reinforces the transportation hierarchy, but ignores the other variables that may force one to walk out of necessity.

One of the two drivers who were asked answered from their perspective as an occasional cyclist and the other from behind the wheel of a convertible:

> I get a profound sense that because I'm on a bike they think I'm a lesser [136A]

> Being in a small car, people tend to take advantage of you more, I think [384A]

Multi-Modal Empathy

If some forms of mobility, particularly in this case automobility, socially disconnect or alienate their users, and intermodal conflict in general is widespread, are

there any "remedies"? One driver suggested the possibility of empathy as nurtured through multiple mode use:

> Yeah there's… definitely a conscious attempt at not hitting cyclists on my part, like, well if I'm driving parallel to them. Whether they have a lane or not I try to give them a bit more space.
> *I: Perhaps I'll ask you why.*
> Well, because I'm a cyclist and I appreciate the space. And also, like, for my own benefit too, like I don't want to get too close to a cyclist… So you actually have to like drive like 25 km/hr and just wait for the cyclists. You can't really pass them. I feel like a lot of people probably get really annoyed with that. I don't, because I am a cyclist [513A]

Another driver, who drove a small convertible, felt alienated by the size differences between vehicles and the might-is-right attitudes and actions of other drivers. Similar to multi-mode users, he suggested that this alienation cultivated empathy for other modes:

> If they figure they can have the right of way because they have a bigger truck, they'll usually take it. And that alienates me, I think. Even if I have the right of way, someone else will just barge ahead—that's alienating. So I think I can have empathy for a motorcyclist to some extent, or a cyclist [384A]

One of Katz's participants knew the might-is-right relationship from behind the wheel of a large truck, from which cars:

> Look puny; kinda like ants, in a funny sort of way. Whenever I'm driving, I don't worry about how reckless I drive because I know that I won't get hurt. My truck is way too strong to sustain any damage. I've run into a few telephone poles, a fire hydrant or two, and even the side of a building. Other than a dent or two, nothing happened to my truck. Not only that, but the company takes care of it all…. So, yeah, I do feel a little more powerful than everyone else on the road (Katz 1999:44)

When Katz's participant switched to his BMW, he claimed: "I'm not as invincible then, and I try to drive a little more carefully, since I know we really can't afford another car if I smash this one up" (ibid.).

As in Jain and Guiver's (2001) contention that the impact of the car can only be truly known from outside of its carapace, one multi-mode user's comments seemed to suggest that exclusive immersion in any one mode undermines understanding of other modes users' perspectives, whereas using multiple modes cultivates reflexivity:

> Walking or cycling, I feel like there's more of a need to negotiate space and especially with cars. The cyclist and pedestrian one, I actually find

> them all quite interesting, in fact, because I've taken each role, you know, the motorist, the cyclist, the pedestrian. So those moments where you realize that you're getting angry with somebody for doing something, you're, like, oh, but wait a second, if you're in that world, then you don't always realize. So I think it's interesting how it makes you more conscious of your actions and your responses [677P]

Does a mono-modal society (regardless of type of mode) call into the question the possibility of mutual respect in the transportation context? Can we expect empathic responses to active mode users from those who are not? One cyclist prescribed multimode use in the interest of cultivating mutual understanding:

> So I guess my comment for that would be, I think every motorist should have to ride their bike to work for two weeks a year. They should pick two weeks and say, I'm going to ride my bike to work every day for these two weeks, just so they know what it's like on the other side of the fence. Like, I know what it's like to drive a car because I drive a car, but I don't think most people who drive a car know what it's like to be on a bike. They have no idea what it feels like to have somebody come blowing by your left elbow at seventy kilometres an hour six inches away. Like it's not fun. You know, they just don't get it. So they don't put... they should put their selves in my cleats as it were [104C]

The shared practice of multimode use may cultivate empathy for other mode users, but if a great proportion of the commuters' travel remains in an automobile, they still forfeit the local knowledge and "face time" associated with active modes. Heise (1998) argues that empathy is contingent on the ability to witness the shared emotional responses of others, a contingency difficult to achieve in the highly mediated environments of automobility.

Conclusion

Kellner argues that "to make strong claims about alienation and technology, one must specify exactly how one is being alienated, what is wrong with this, and what should be done about it…" (2006:60). The evidence presented here suggests that the techno-practice of automobility may in some ways socially alienate drivers and those outside the car. A majority of multiple mode users felt more connected when using less mediated modes, such as cycling and walking, than when driving. Cars were seen to produce a sense of isolation, and to frame or limit participants' experience of their commute. Some, however, were hesitant to judge the difference, preferring instead to describe them as

simply different *types* of experience or knowledge rather than *depths*. Approximately half the number of drivers as pedestrians or cyclists recognized people on their commutes or spoke with them. Some pedestrians were disturbed by the lack of communication between familiar commuters, but some of these and others expressed attachment to the familiar people, and animals, of their commute regardless. Thus attachment developed through ongoing recognition, even in the absence of communication, a finding that agrees with the Game Theory research. This attachment was noticed particularly when the familiar other was absent from the routine. Evidence of the communication asymmetry discussed by Katz was revealed by the "famous commuters" who were known by, but did not know, passing drivers, and the influence of modal arrhythmia on this phenomenon was noticed by some. Cyclists demonstrated solidary action, particularly with those who share their practice, perhaps loaning support to Durkheim's ([1897] 1951) theories on solidarity. Most drivers were, conversely, ambivalent about others during their commute, with the exception of one who spoke of their brand community.

When asked about their interactions, most participants expressed very negative, sometimes traumatic experiences, particularly with respect to other mode users. Pedestrians and cyclists spoke of being ignored, yelled at, or sometimes physically attacked, mostly by drivers. Their expressions of unbelonging and sense of invalidity flagged some level of alienation, though later many preferred other terms or concepts to describe how they felt. Some cyclists attempted to bridge the communication gap by chasing and confronting drivers. Several active commuters spoke of the fear they felt with respect to aggressive drivers and risk of injury. Drivers did not explicate a sense of fear, though they did struggle with conflicting interpretive lenses through which they judged those outside their carapace. Drivers were sometimes ill at ease about this negative, judgemental perception they seemed to possess while driving, and described it as unlike their normal nature; this is perhaps demonstrative of how the automobile technology changes the driver with whom it forms a hybrid. Drivers were irritated with the practices of other mode users, which they generally understood to be lawless and inconsiderate. However, some participants simultaneously revealed sympathies for other modes, betraying a capacity for empathy. Whereas the active mode users preferred other terms such as "marginalization", half of the drivers felt alienated or estranged. Wrapped

up in all participants' senses of alienation, or alternative conceptions, were notions of space, rights, and coercion. Multimode users, and some who used less encapsulated motor vehicles, described the empathy that may be encouraged through the use of less mediated, or perhaps more vulnerable, modes.

Three of Seeman's (1959) five facets of alienation were evident in the participant's words, namely: social isolation as experienced within the fast moving shell of the automobile, powerlessness as in the sentiments expressed by some active mode users, and to some extent, normlessness as arose in cases of road rage and conflicting views of traffic law and use of space. "Alienation" is a term perhaps too polysemous to be used as a catch-all for the various feelings of disconnection, marginalization, isolation, and estrangement experienced on both sides of the windshield. One of the key discoveries of this research is that active mode users feel alienation as an injustice, or marginalization, whereas drivers feel it more as isolation or estrangement. Therefore, these alternative terms should be considered alongside alienation.

A commuter's sense of connection may change across a continuum of technological intervention whereby more intensive technological assemblages seem to undermine social connection. For instance, those who drive convertibles may claim a greater sense of connection to those outside the carapace than do drivers enclosed in hard-tops. Also, commuters seemed to feel most connection with those using the same or less technologically mediated modes than their own. For instance, pedestrians were familiar with other pedestrians and those sitting or reclining along their walk, drivers to a lesser extent were familiar with other cars and pedestrians. Contemporary transportation technologies may, as in the case of mobile cellular service, extend certain aspects of one's social interaction, but severely curtail others. Whereas for the participants in this study the automobile generally isolates, one participant spoke of the way in which their brand created a sense of community, and the presence of other passengers (Laurier et al. 2008) or mobile cellular technologies may also alleviate some of this isolation. In this article, however, the positive integrative potential of the automobile technology is suggested more by the literature than the participants.

De Cauter (2004) emphasizes the importance of speed with respect to capsularization, and this association could be found in participants' words, such as the

passing “blur” of those in automobiles. It may be that faces, specifically, are more familiar to pedestrians than drivers, and to some extent cyclists, because of their slower speed and the inherently face-to-face nature of their mobility (Goffman 1971). The steel, glass, and speed of the automobile establish a communication asymmetry where drivers may recognize pedestrians who do not recognize them. Whether the “famous pedestrians” who do not recognize their driving “audience”, or the drivers themselves are socially alienated is difficult to determine, though pedestrians and cyclists generally felt ignored by drivers.

The differences in scale between drivers’, cyclists’ and pedestrians’ commute landscapes may explain some differences in sense of connection. As suggested earlier, smaller scaled, closer places become infused with social meaning. Habermas (1984; 1989) argues that cultural, shared meanings are maintained or changed through everyday interactions and specifically communicative actions, and through this foster a sense of community and collective efficacy (see also Putnam 2000; Sampson 1988; Sampson, Raudenbush and Earls 1997). Environments that maximize the potential for these face to face interactions, such as pedestrian scaled environments, support this important social function by providing a “stage” on which pedestrians can ground or challenge existing typologies (Demerath and Levinger 2003:225). Demerath and Levinger (ibid.) provide the example of pedestrian scaled streets in Toledo, Spain; this author experienced similar pedestrian scaled streets in Lijiang (丽江), a city in Yunnan Province, China (see Figure 3), and there are no doubt many other examples. However, with respect to the difference in awareness of one’s surroundings, the distinction that some participants made between the volume, depth, or resolution of information as compared to the scale or scope raises more questions than it answers. Drivers may take in a quantitatively similar volume of information, at least visually, but the “information per square kilometre” may be less, and over a broader sweep of kilometres. How does this affect the *quality* of the knowledge accrued? Is this “spread out knowledge” disconnected, or does it hold the same or different, or more or less meaning than does the spatially “dense knowledge” of a person who moves at a slower speed? Again, are places and people experienced at different speeds in fact different places and people? Equally perplexing, one cyclist felt that there was a difference in awareness between modes, but no difference in sense of connection.

Does this support Casey's (1993) conviction that one's connection is not contingent on one's way of moving in the world?

Figure 3. The pedestrian scaled streets of Lijiang, Yunnan Province, China.

In the transportation and mobilities literatures, an important distinction is sometimes made between mobility and *accessibility*. The former refers to a person's ability to move about, the latter the extent to which needed services are nearby. The distinction is important because higher levels of accessibility reduce demands on mobility. For example, the "ten minute neighborhood" approach to city planning used in Portland, Oregon, aims to plan neighborhoods in clusters where a person can walk to all services within ten minutes, thus eliminating the need to drive. If the concept is applied to the social milieu, and people and communities need face-to-face social interaction to maintain solidarity, then perhaps slower modes, and less technological intervention, increase accessibility. In this respect the current topic tentatively speaks to the broader question of whether proximity influences social integration, an association with great implications for the social and ecological integrity of an increasingly "wireless society".

Within the diverse and growing canon of mobilities literature, the automobile, and its associated complex of built environments and social institutions, is accused of a

multitude of undesirable social and environmental impacts. For instance, the current transportation laws and infrastructure facilitate "might-is-right" inter-vehicular relationships and reinforce hierarchical relations between modes, and thus fuel road rage, alienation, and possibly status syndrome. Yet the majority of Canadian and US citizens are unwilling to change modes even when faced with major traffic congestion problems (Associated Press 2004) and warnings of dire environmental consequences (Lyle 2006). Why then, does this system persist? If automobiles and their associated systems do, in some significant way, alienate their occupants, the cumulative impacts may be multi-scalar, from Transportation Demand Management challenges to the perpetuation of global socioeconomic stratification and environmental injustices. If the encapsulated members of a society are disconnected from their social and physical environments, can we expect them to make an effort to realize beneficial social change? Can similarly alienated decision makers be expected to altruistically lead in absence of public pressure? This article argues that active mode use facilitates greater connection to non-automobilized social environments, and thus one way to reduce the alienation of the broader public. The discussion on empathy suggests that the tension between automobile and active commuters may only be relieved when they "cross over" and immerse themselves in other mobility experiences. If drivers exit their automobiles, like their gridlocked equivalents in Mexico City, they may find a greater sense of community.

Policy Recommendations

This study found that active modes may socially connect commuters more than do motor vehicles. For this and other reasons, these modes deserve further support and promotion. Because the use of multiple modes may cultivate a broader understanding of, and thus empathy for, other mode users, mode shift programs that encourage "baby steps" are probably of value in their potential to discourage intermodal conflict such as road rage, and expose the unfamiliar to new transportation options. Strategically, the most benefit may be found in targeting these programs at direct and indirect transportation decision makers such as politicians, planners, and engineers.

When designing mode shift plans, the social particulars of each mode practice should be taken into consideration. For example, social marketers may wish to advertise

ways for pedestrians to acknowledge, or "break the ice" with familiar fellow commuters in ways that insure the personal safety and sense of security of all actors. The safety of cyclists increases when more people ride (Jacobsen 2003), and a similar effect may exist for pedestrians whereby the presence of others decreases the risks associated with "stranger danger" (Duneier 1999; Jacobs 1961). Similarly, the sense of isolation felt by some drivers, and its remedy, may be exploited in ad campaigns.

According to the literature, fear may play a significant role in what drives people to adopt automobility as their primary mode—fear of having to deal with other people and their problems, fear of unfamiliar types of people, fear of sweating, fear of wind, fear of getting wet, fear of being hit by a car, fear of appearing of low or high income status. Social marketing campaigns may do well to counteract these fears with actual probability comparisons and emphasis on the benefits that outweigh the risks, such as the longer lifespan of cyclists regardless of collisions.

Progressive politicians and planners must address the laws and landscape features that conjure the sense of "unbelonging". As I argue elsewhere (Nixon Forthcoming), decision makers must eliminate regulatory discourse that frames the modes as equal, and instead acknowledge the current inequalities. The transportation hierarchy should be inverted so as to alleviate feelings of marginalization and injustice amongst active mode users. This may also attend to status syndrome effects.

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Work to Bike: Should Pedestrians and Cyclists be Paid for Their Mobility Labour?

April 26th, 2012

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Introduction

In one of the blue-collar jobs I held growing up, my co-workers would accuse each other of "ducking out of work", "hiding behind the gravel pile", or being "afraid to get your hands dirty". This blue-collar work ethic, Protestant in origin (Weber [1930] 2001) or otherwise, insisted that everyone needed to do their part, and implied that manual, material labour was the only, preeminent form of labour. When the paid work day was over, most of my coworkers would drive home. I would return home on my bicycle, a manual practice seen by some of my coworkers as juvenile play at best, outright crazy at worst, but certainly not "real work" of particular value.

Is it possible to see human powered mobility as a form of unpaid labour? If so, does this labour have value? Is this value appropriated by drivers who receive the surplus benefits, without reciprocation, of pedestrians' and cyclists' labour, for example in the form of less polluted air, usurped taxes for road maintenance, or highway emergency services? This article presents some empirical material and draws parallels between active transportation and the pay-for-housework debates to answer these questions in the affirmative.

The article begins with excerpts from the interviews and commute-narrative recordings of 15 pedestrian, 15 cycle, and 16 motor vehicle commuters in the City of Vancouver conducted in 2009. The words of the participants reveal a sense that active transportation is sometimes experienced as work, and so the discussion that follows addresses what actions constitute labour. The second section grapples with what comprises labour of value, and looks specifically at pay-for-housework debates. The third section applies the material from the first and second sections to active transportation and includes a discussion of how the labour value of walking and cycling could be calculated, or whether it should be in the first place. The fourth section addresses the notion of alienation *vis-à-vis* active transportation as labour of value. Finally, based on the preceding discussions, the concluding section offers some policy recommendations that include payment for active commutes, rectification of transportation budgets so that the proportion of infrastructural spending on a mode matches its mode split, and/or rewritten transportation policy and management job descriptions to include personal use of the modes their policies affect.

Active Transportation as Work

Active transportation is seldom framed as labour, yet active commuters sometimes reveal a sense that movement under one's own power is in fact *work*:

> …it's a lot of work, you can't just press on the gas and go, you have to really work at it to get that momentum going again... [981C[9]]

This quote conveys a sense of the labouriousness of active transportation as experienced by one cycle commuter. The following pedestrian made a similar comment:

> I'm aware I guess when I have to go up hills that it's more of an effort to keep that momentum going. You know I have to work a little harder physically just to keep the pace [751P]

One driver who often rides a bike described his sense of "working together" when cycling amongst other riders:

> I definitely think that there's that unmentioned thought, like when you come up to a pedestrian controlled light, with a group of cyclists, especially at like five in the evening, and there's a lot of people biking. No one talks about it but everyone's kind of working together, they're all traveling together [513A]

If active commuters tell us what they do is work, should we believe them? A review of the thirty-two definitions of the noun "work" in the Oxford English Dictionary suggests that self-propulsion may indeed qualify as work, be it seen as an action involving effort and exertion, a task, an "operation of force in producing movement", or a sporty exercise (OED Online [2001] 2011). Similarly, the first three definitions of "labour" could describe active transportation:

> 1. a. Exertion of the faculties of the body or mind, esp. when painful or compulsory; bodily or mental toil…
> c. Bodily exercise.
>
> 2. a. *spec.* in modern use: Physical exertion directed to the supply of the material wants of the community; the specific service rendered to production by the labourer and artisan.
>
> 3. An instance of bodily or mental exertion; a work or task performed or to be performed. (OED Online [2001] 2011)

[9] The code following the quote is as follows: participant number, mode (A=automobile, C=cycle, P=pedestrian), and source (CN=commute narrative).

According to the OED, the notion of exertion or effort is associated with labour. Active mode users also mentioned a sense of exertion. During his commute, this cyclist described the negative sense of effortlessness with which he associates automobility and conversely the effort of cycling:

> Fuel culture without effort. Car culture without effort… 'Must drop kid off as close to school as possible'… [A friend] rides up to SFU [atop a mountain] every day. Well, most days, she says. Now that takes effort, and a certain amount of resolve to live like that [139C_CN]

This cyclist echoed that sentiment in his interview:

> In a car you don't really care right, because it's not your effort. It's a gas pedal so you don't really care as much… it's not like when you're on a bike when you see a hill, you know it's gonna be more effort, right. In a car it makes no difference. You're just gonna like, hold the pedal down [767C]

As Parkin et al. suggest: "cycling is distinct from other forms of vehicle transport in that it requires human effort to provide the locomotion. This is self-evidently true of walking, but the coupling of a rider with machine appears to heighten awareness of the effort being made" (2007, page 75). For active mode participants who sometimes carried or pushed things, the extra weight of the objects exacerbated the effort of movement:

> And sometimes I'll just walk [my bike] up Birch. But I find walking just as tiring in its own way—pushing the bike—because I'm always carrying something [372C]

> I've got a pack and that can sometimes be quite heavy and I'm aware of that and that it is more effort… [751P]

Interestingly, automobiles too were personified as 'working' by several participants within each mode affiliation:

> As soon as I leave my house I have this hill which is quite steep. Hear the cars labouring up it as well. I've always lived on a hill [139C]

> My car always struggles up this piece of the highway. I wonder why [563A]

It would be a glaring absence not to acknowledge that the practice of driving too is labour, as the aforementioned truck drivers and heavy equipment operators would attest, though

on a continuum of *human* effort usually not nearly as demanding per unit of distance or time as active transportation, or even other, older forms of driving:

> Complementing the sheath of speed, the actions needed to drive a car, the slight touch on the gas pedal and the break [sic], the flicking of the eyes to and from the rearview mirror, are micro-notions compared to the arduous physical movements involved in driving a horse-drawn coach. Navigating the geography of modern society requires very little physical effort… the body moves passively, desensitized in space… (Sennett 1994:18)

Most importantly, professional drivers and machine operators are different in that they are paid for their effort.

It is worth noting that this exertion is not necessarily strictly physical. Marx suggests: "however varied the useful kinds of labour, or productive activities, it is a physiological fact that they are functions of the human organism, and that each such function, whatever may be its nature or its form, is essentially the expenditure of human brain, nerves, muscles, and sense organs" ([1867] 1976:164). All of the aforementioned labours employ all of these faculties and the cognitive demands are heightened by the presence of automobiles (see, for instance: Berman et al. 2008; Hank 2007; Taylor 2003). Labour is often associated with the notion of 'skill'. In the same way that a skilled craftsperson develops an intimate, tacit knowledge of their medium through their interactive labours upon it (Harper 1987; McCullough 1996), so too pedestrians and cyclists, through the sense experience of their work, develop a knowledge of their landscapes (Spinney 2007) that may, for instance, increase energy efficiency (Nixon Forthcoming). In this respect their labour may be seen as 'skilled'.

The quote from the *Oxford English Dictionary* mentions that the exertion of mind or body amounts to labour especially when *painful* or *compulsory*. This perspective was held by Adam Smith, who saw labour as akin to "toil and trouble" or "hardship endured" (Smith [1776] 1848:12-13). It is in fact necessary to distinguish between voluntary and involuntary work, and this distinction will arise again later in the article. Several participants, though a minority, were forced by their economic situation to walk or ride their bicycles, and some brought up pain:

> I know the light patterns on my route, and I will slow down so I don't have to stop. Because it's just such a pain to stop and start [993C]

This participant described their awareness of the fraction of time people spend not only at work, but getting to and from their work location:

> It's bad enough that you're spending a third of your life working, and then you're going to spend a fifth of your day, well everyday, just getting to the job, and getting back [395P]

Here the difference between work and the commute becomes blurred. The US Bureau of Labor Statistics categorizes commuting as a "work related activity" whereas other mobilities are placed under the rubric that best frames the trip purpose (US Bureau of Labor Statistics 2007:47; US Bureau of Labor Statistics 2010a). However, according to the June 2010 *American Time Use Survey Questionnaire* (US Bureau of Labor Statistics 2010b:24) commuting and getting ready for work are not to be included in the participants' self-reporting of the hours they spend at work. Clearly employers who pay for their employees' commutes recognize movement to and from work as part of their responsibility, despite the fact that it may represent a cost rather than benefit to the organization (Litman 2011).

If active transportation practices are in fact a form of labour, the question remains as to whether they are a labour of any value. If they are, I argue that it is problematic that this labour of value goes uncompensated. The next section reviews the "political economy of domestic labour" or "pay for housework" debate. The pay for housework argument resembles that which I put forward here, and components and nuances of the debates that ensued provide some structures and lessons for considering and accounting for the value of active transportation labour. Some of the questions that arose may be asked in the valuation of active transportation labour.

Value of Labour: The Pay for Housework Debates

Wage labour is recognized as labour of value, versus unpaid but still often inherently necessary labour. In contemporary culture "real work", i.e. work of value unquestioned, is that which is paid.

> So when is work work? The common-sense litmus test asks whether it is paid. People go out to 'work' for a wage. We're left short on words to describe adequately the effort people expend on unpaid tasks useful to survival from day to day, from generation to generation. Former generations would have been in no doubt that growing vegetables entailed

> work. Today, this is known as ‘gardening’ and regarded as a hobby. (Kaluzynska 1980:29)

The socially constructed and ultimately unstable distinction between work and hobby or play will surface again later in this article. According to Benería: “…the problem stems from the way ‘work’ has been defined, both in theory and in conventional statistics, as a paid economic activity linked to the market” (Benería 1999:288).

Arguably the most developed and powerful call to recognize and account for unpaid labour can be found in feminist discourse. Domestic labour, traditionally deemed “women’s work” and primarily performed by women, perennially escapes inclusion in national labour statistics and accounting. Those who critique this absence contend that failure to count domestic and care-giving labour as authentic work alongside traditionally recognized paid occupations undermines its perceived value. Some consider domestic work, biological reproduction, and child-rearing part of “reproduction of labour”, because such labour is necessary to maintain the paid workforce. Feminist scholars engaging in the domestic labour debates may be traced back to Margaret Reid’s (1934) *Economics of Household Production*, Ester Boserup’s (1970) *Women’s Role in Economic Development*, and Marylin Waring’s (1988) *If Women Counted*. Originally, it was meant to raise the public consciousness of the plight of housewives, rather than formally demand wages (Kaluzynska 1980:37).

The domestic labour debates in the Marxist literature of the 1970s, dubbed ‘the political economy of domestic labour’, arguably began with Margaret Benston’s “The Political Economy of Women’s Liberation” (1969; see also: dalla Costa and James 1972; Delphy 1971), and centred around whether housework could be considered ‘productive’ and to have ‘value’. The following idiom provided by Seccombe dramatizes what he and others saw as the status quo of the time:

> Teacher: Who works in your family, Jimmy?
> Jimmy Jones: My father.
> Teacher: Do you work, Mrs. Jones?
> Jimmy’s Mother: No, I’m a housewife (1974:20)

The debates ignited when some scholars and activists, writing from feminist standpoints, plucked Marxist terminology from its contextually specific origins to use it, in a more colloquial fashion, to clarify the oppressive dimensions of the housework normally

performed by women, and to charge their arguments politically. In retrospect it seems that for some this was a synthetic exercise whereas for others it involved the use of Marxist class politics as a convenient analogy. Several of the authors were attempting to identify whether housewives were positioned to play a role in overturning capitalism, and if so, what exact strategy or role they should play in revolutionary action. However, a backlash against this approach to politicizing and 'commodifying' housework soon followed. Those loyal to a traditional interpretation of Marx took issue with this conceptual 'loan', particularly the alleged misinterpretations of the constructs as well as what they saw as incommensurability between domestic versus 'social labour', and between gender versus class revolutionary strategy (Molyneux 1979). Those from the feminist quarter contested what they perceived as the reduction of housework and women's oppression to strictly economic, detail-oriented, and particularly Marxist, frameworks and goals, devoid of revolutionary struggle in the sense that they envisioned it (Fee 1976). Over fifty articles were published on the subject in socialist and feminist journals during the 1970s (Kaluzynska 1980).

According to Molyneux "the principal questions addressed by the debate have been whether domestic labour creates value or not, whether it produces the commodity labour power or not; whether it is subject to the law of value, whether it is productive or unproductive—and so on" (1979:21). Some authors were particularly blunt: "in Marxist terms, by definition domestic labour has no value" (Coulson et al. 1975:62). It is important to remember that Marx was not arguing in his labour theory of value that the surplus value appropriated by the capitalist was *the only*, *ontological* value or worth. Rather, his conception of value was designed particularly to describe the nature of exploitation in a capitalist economy, and how value is determined. In this respect, Marx does not refute earlier descriptions of what we might now call 'subjective value' in the interest of defending a Ricardian ([1817] 1913) interpretation of value as originating solely in labour time for Capital. Similarly, Marx does not state that domestic labour has no *use* value, but rather that under capitalism exchange value is recognized, whereas use value, the domain of unpaid housework[10], is secondary (Benston 1969). Some in the

[10] Domestic labour sold on the market as a service clearly has an exchange value, though this still does not necessarily mean it is "productive".

debates attempted to argue that domestic labour constitutes both use and exchange value, owing to its integral connection to the biological, domestic, and social reproduction of labour power and thus surplus labour (Dalla Costa and James 1972; Larguia and Dumoulin 1972); these arguments were criticized by those who insisted that true "productivity" (under capitalism) required a pure, "direct" connection to capital (see, for instance: Coulson et al. 1975; Gardiner et al. 1975; Himmelweit and Mohun 1977; Molyneux 1979).

The standard Marxian definition of a "productive labour" requires that the labour be performed *directly* for capital, and that it produces surplus value (Marx [1867] 1976:644). In this respect Marx's "productive labour" could be thought of as "profit making labour". Therefore, productive labour is only that which is exchanged for wages directly with capital. Activities like housework produce use values, but not marketed commodities or surplus value. According to this definition then, domestic labour cannot be seen as productive, or as having exchange value, because it does not interact directly with capital production, for measurable pay, nor can it be seen to contribute directly to measurable profit (i.e. there is no way to demonstrate an exchange value or surplus value) (Fee 1976). Marx explicitly follows Adam Smith ([1776] 1848) in excluding reproductive labour from the rubric of productive labour for fear that the term would be over-assigned (Marx [1862] 1969).

dalla Costa and James (1972), and Seccombe (1974) argued that because domestic labour creates use-values it is therefore a socially necessary, productive labour. Some in the debate claimed that housework escapes the productive/unproductive binary (Fee 1976). More recently, Harvie (2005) contends that the productive / unproductive labour distinction is in many respects unhelpful for contemporary analysis, but that certain things it reveals suggest it should be retained in some less-powerful form:

> The Classical Marxists tend to neglect the myriad interconnections between waged work and unwaged, the 'economic' and the 'social', production and reproduction… Marx explicitly ruled out the labour of producing and reproducing labour-power as being productive, and most Classical Marxists have followed him on this point, categorizing it as unproductive or non-productive. Today, such a position seems less and less tenable… So, all labour is productive… But productive and unproductive labours are commingled… *All* labour can be *either*

> productive *or* unproductive, or rather, all labour tends to be *both*. (Harvie 2005:154,155,160, original emphasis)

These debates only highlighted what the original feminist contributors saw as a deficiency in Marxist concepts. According to Kaluzynska: "if the theory wouldn't recognize that housework produced, produced value, and what's more surplus value, then there was something wrong with Marxist concepts" (1980:42). Perhaps the difficulty with much of the debate was not the semantic precision or imprecision but rather the persistence of definitions less well-fitted to the grounded reality of unpaid labour in the contemporary context. Many of the charges levelled against the original wages-for-housework proponents fail. Neither the fact that women may be both unpaid houseworkers and income earners simultaneously, nor the heterogeneous nature of housework, nor the varied demographic background of women, nor the gendered division of domestic labour undermine the argument that housework is often an unrecognized labour that produces significant social value.

In retrospect, an important consideration is whose sense of value is recognized. In *Capital Vol. I* Marx clarifies whose sense of value he is concerned with: "productive labour, *in its meaning for capitalist production*, is wage-labour which… produces surplus-value for the capitalist" (emphasis added, Marx [1862] 1969:152). The answer to this question—whose value—contextualizes the entire 'consciousness raising' exercise. Can we consider domestic labour's value to *society*, rather than to *capital*? For the purposes of this article, it is worth noting that within the heterogeneous body of domestic labour exist a number of practices with environmental and social benefits. Sorting and dealing with home recycling, composting, cooking "from scratch" (and thereby avoiding excess packaging), and cleaning cloth diapers exemplify unpaid domestic labour that in various ways benefits society and future generations as a whole, or at least does not cost society, as does the less sustainable status quo.

Active Transportation as Valuable Labour

Like housework, active transportation "…still remains a privatized labour outside of the exercise of [Marx's] law of value" (Seccombe 1974:9). The value of active transportation labour is never discussed, besides implicitly in the health-related sense of

exercise or individual cost savings, but it can be seen in the movement of people to and from their spaces of formal productivity and the full range of larger social and environmental benefits. Consider public transit or the rickshaw, where the movement of people is a marketable good; is self-propulsion to get to work not in some sense "subsistence" labour, the same as a mother fetching wood for her family?

Compared to the North American transportation *status quo*—'automobility'—active transportation improves health, lowers or eliminates pollution, and saves resources. Population health is improved not only by the increased fitness and well-being associated with cardiovascular exercise, but also reductions in automobile collision related injuries and deaths and the negative health effects of combustion engine exhaust pollution and its greater manifestations (e.g. smog, particulates). Improved health supports a more productive workforce. Bicycles and walking footwear consume far less petroleum than is needed to maintain motor vehicle tires and parts or to fill fuel tanks. Not unlike domestic labour, active transportation is reproductive labour—it in part reproduces the workforce. The active commuters' value exists in the useable and/or exchangeable worth of the products or services created—namely the environmental and social benefits—to society. This begs the question of how health and environment should be priced, if it is in fact possible to place a price on their interconnected facets considered invaluable by many, something which is discussed further below.

Many of the benefits associated with active commute labour may be seen as 'value not detracted' rather than 'value added'. The exertion and expenditure of energy of walking and cycling ultimately reduce society's, and thus by necessity some corporations', costs in realizing surplus value. These costs are known as 'externalities' and include such things as air pollution, traffic collision damage and injuries. These externalities may erode government revenue and corporate profits. According to Haab and McConnel (2002) the environmental costs of automobiles total 3-8 billion Euros per year, and the collision costs 4-8 billion Euros per year. Fatal and non-fatal motor-vehicle related injuries in the US in 2005 cost a total of 99 billion dollars in lifetime medical interventions and lost productivity, or $336 per capita for that year (Naumann et al. 2010). Todd Litman (2009) estimated that automobility in the US incurs an annual external cost of approximately 1,156 billion 2007 US Dollars. One "use value" of active transportation

is the reduction of these figures; these cost savings may substitute for exchange values, as discussed below.

Pedi-cab work, with its physical and monetary exchange with capital could also be rendered "productive labour". Many paid active transportation workers, such as a bike messenger in my study, also commute 'actively'; just as the female employee's unpaid housework is still of value, so too are these unpaid commutes. When someone is walking or riding their effort, their labour, is evident in their unassisted movement regardless of bicycle or walking shoe technologies. This is different from the heterogeneous practices of housewives where in some cases high economic solvency may alleviate the workload, and in others poverty, religious affiliation, or environmental ethics may demand a full day for the physical exertion of household laundering.

Accounting

If at this point the reader accepts active transportation as a *productive labour* that should have *value*, the question remains as to how this value should be recognized. It could be measured monetarily. There are currently two approaches to estimating unpaid production: impute value, such as monetary figures, to labour time (input value); or, impute value to the goods and services produced (output value). In the case of housework, to impute value by labour time one can calculate the average cost to hire a formal domestic worker to perform the same work—a 'global substitute'. This then would represent the market exchange value and may vary depending upon whether the domestic worker labours independently or under paid employment. An opportunity cost approach might calculate the wage that the unpaid domestic worker might otherwise receive in the market for the same or a different skill-set they hold (Benería 1999:297). In the current labour market this would clearly depart from, and most likely exceed, the global substitute calculation, particularly given the low pay for domestic labour.

The application of these approaches to transportation might involve the substitution of the cost of hiring a taxi, bus, or rickshaw, and a driver, to move about, which is assumed to include fuel, repairs, and depreciation. This may also include the often unaccounted perverse subsidies that keep the costs of motorized transportation artificially low. Other possibilities include the calculation of the benefits associated with

driving that are forfeited with the substitution of active transportation, the wage that might have been earned as a professional driver, or the time and wage equivalent potentially lost in paid employment owing to the longer commute times of a given trip length for active transportation[11]. I discuss the complicated issue of trip length further below.

To impute the value of the goods and services produced may require grander and more approximate, though still very worthy, calculations, such as those for reduced health care costs and the price of environmental damage mitigated. One difficulty lies in establishing the link between active transportation labour and the value it indirectly precipitates. Seccombe's contention that, "concrete labours may be far removed—in terms of time, space and product form—from the finished commodity exchanged on the market" (1975:87), is especially descriptive of benefits to the commons. However, there are a number of ways that environmental and ecological economists have attempted to determine these values in monetary terms. One way is through simple cost savings estimations based on externality cost figures such as those mentioned above. For instance, if US drivers switched to the pedestrian or cycle modes they would apparently each save $12.99-13.37 per day in external costs (Litman 2009). According to Litman, then, cycling and walking may be worth approximately $13.00 per person per day. This is considerably more than the 0.21 Euros suggested by a new Belgian government program, called *Fietsvergoeding*, that encourages employers to compensate cyclists for their commutes. Another attempt to capture the subjective value of goods and services of benefit to the environment or health uses the concept of 'Willingness to Pay' (WTP) and 'Willingness to Accept' (WTA). With this economic tool, members of the public are surveyed to determine what price they would pay for a particular environmental good, or what price they would accept to tolerate an environmental 'bad'. If a solid relationship could be established between a walked, cycled, or driven kilometre and its impacts, the WTP or WTA figures associated with a particular impact could be assigned back to the kilometre.

Commute distance, and the nuanced determinants of work and residential location add a layer of complexity to these calculations. Distance may be determined on a

[11] This may not apply in dense urban centres where riding, or even walking, may be faster than driving.

continuum between completely voluntary to completely involuntary depending upon the variables influencing a commuter's residential location. For instance, income is a well known predictor of 'spatial mismatch'—whereby the places that low-income earners are able to live are often located far away from employment opportunities. If active transportation users live closer to work then some way must be found to account for the shorter commutes times so they are not penalized for doing so.

Seccombe (1975) contends that the value of the housewife's labour is observable when paid work is taken up and part of that income must go toward hiring someone else to do the work, not unlike the 'global substitute' mentioned above. This also demonstrates, however, the low value (in monetary terms) afforded domestic labour. Thus Seccombe sees the act of measuring domestic labour value by recording what such labour would be, or is, paid in the market, as potentially deceiving: "this is an exercise in bourgeois reasoning involving a complete capitulation to the deceptive rationale of the wage form. It is based upon the assumption that wages are a measure of the value of work done rather than a monetary package paid to ensure the family's subsistence" (Seccombe 1974:13).

The same critiques of the feminist efforts to reframe and count domestic labour as 'real work' may also apply to this effort to reframe and count active transportation. For instance, replacing unpaid domestic work with paid domestic work may have done little to improve its relative valuation, as seen in domestic workers' and care workers' minimum wages (though from an economists' perspective minimum wage represents greater recognition than no wage). Quite clearly the use values of socially and environmentally productive labours do not equate with market values. Similarly, the category of "work" itself may undervalue the full extended meaning and nuance of labour, and reduce it to a mere quantity. It may bifurcate and polarize the value ascribed to work versus non-work (Himmelweit 1995).

Like many other forms of labour, there may be, in addition to a sense of sweaty drudgery, pleasant feelings associated with effort and exercise, or as Benería describes it "…the pains and pleasures of work…" (1999:302). During their commute narratives, the active mode users in this study sometimes had mixed, in some respects contradictory, interpretations of their commute. Some described walking or riding up an incline as good

exercise; at other times as sheer work. These were not mutually exclusive, of course—a physically challenging segment may 'work up a sweat', and be seen as laborious in the moment but ultimately beneficial to the long-term health of the pedestrian or cyclist.

> …I don't want to give up that, um, I don't know, the endorphins or whatever that produce when you're exerting [981C]

> It's funny—I got home a little earlier yesterday than I will today. That's OK. Nice to get a little workout after school [774P_C92]

> Good workout going up this hill [774P_C90]

Unlike the American Time Use Survey Guide that states that "walking is considered traveling when used to get from one destination… to another, but not when the primary purpose is exercise" (US Bureau of Labor Statistics User's Guide 2010:42), my participants expressed some ambivalence about the distinctions between working and 'working out', physical labour and exercise. Where does work end and exercise begin? For Harvie too the distinction is not so clear; rather, there is an increasing absorption of fitness activities into the domain of 'involuntary' labour:

> What is particularly interesting is the approach of an increasing number of people to their 'fitness' activities. For many, good health is not a benign by-product of participation in enjoyable physical recreational activities, coupled with a naturally balanced diet. Rather it is something to be attained and maintained through 'scientific' and 'efficient' exercise programmes, which becomes a chore: the time spent doing 'exercise' must be minimised and, if possible, it must be combined with some other activity. In this way attaining and maintaining a certain physical appearance has, for many, become a labour activity, even one with its own associated socially-necessary labour time. (Harvie 2005:157)

A perfect example of this blur between work and fitness is the recent investigation into the feasibility of pedal exercise machines for use at office desks (see Carr et al. 2011).

It is important to interrogate active transportation as 'fitness' or 'exercise' because these labels may connote hobby or pleasure, whereas the opposite may be true: "these activities are increasingly becoming subject to more pernicious 'benchmarks', 'social norms' and so on. Essentially, reproductive activity is increasingly becoming subject to *measure*…" (Harvie 2005:157, original emphasis). Perhaps the distinction between pleasurable exercise and painful, compulsory labour is the fuzzy line between *having* to do something versus choosing to do it.

Benería identifies four areas in which unpaid work may be categorized, namely subsistence production, the household economy, the informal sector, and volunteer work (1999:289). In many instances these areas overlap, and it is odd that Benería fails to describe what might constitute domestic *versus* subsistence activities. The distinction between subsistence and voluntary work is interesting. As Benería points out, the majority of officially recognized volunteers are in the upper income strata, which may obscure the large numbers of low-income people performing less socially recognized volunteerism. Thus the 'professional' who registers for a run for cancer is acknowledged as a 'volunteer' who performs a labour of value, and is able to add that to their resume, whereas the person who consciously chooses to run to work every day in part to reduce carcinogenic air pollution and reduce their own susceptibility to cancer, or because they cannot afford to do otherwise, does not. Mobility is probably best captured by 'subsistence', though this begs the question of what constitutes the voluntary.

Are Active Mode Users Alienated?

Does the North American transportation system support exploitative relationships between mode users? Specifically, is the labour required to move oneself to and from the workplace appropriated labour? All citizens who contribute a portion of their paid labour to property taxes (some via rent) pay into the motor-vehicle transportation system (including most public transportation). However, cyclists and pedestrians clearly fail to receive a return on their tax investments and instead subsidize motorists (Litman 2004). In this sense, do automobile and public transportation users 'exploit' the labours of active mode users?

For Marx, the separation of the labourer from the product(s) of their labour is one of the key sources of alienation. Christine Delphy (1977) draws a comparison between capitalist and patriarchal modes of production. In both cases a dominant party (capitalist, patriarch) exploits the labours of their subordinate (worker, women). A similar comparison may be drawn between these exploitative power relations and those of drivers and active mode users, whereby the value produced by active mode users benefits the driving public without reciprocation. This is a more economic reading of the argument that automobility alienates both drivers and those outside the car (see, for instance Jain

and Guiver 2001; Urry 2007). The assignation of value is often spatially contingent; those not only outside the car but in the rain gutter or on the sidewalk are by their environments afforded less value. This is evident in the built environment, such as in the discontinuity of sidewalks (versus the continuity of motor vehicle roads) (Patton 2007), or the untended surfaces of rain troughs.

Surely many, though not all, active mode users make a "free choice" to walk or ride. However, it is neither fair nor sensible to in a sense punish, rather than reward, a free choice that benefits the commons. Similarly, one might question that actual freedom of choice if it is strongly influenced by a person's ethics or spiritual beliefs. When it is clearly not a free choice, as in the case where poverty forces active mode use, the relationship is yet more unjust. As Kaluzynska maintains: "some tasks people would rather not do. But they have no alternatives, or see none. Much of today's housework might be described thus" (1980:29). Most of the pedestrian and cycle participants in this study enjoyed their transportation mode, though there were conditions (weather, traffic, contour, etc.) that rendered the practices in particular times and places memorably unpleasant. The active commuters that persist despite these conditions often do so because they see no other option that abides by their social and environmental ethic. Almost all active commuters in the study mentioned social and environmental impact alongside cost and time variables:

> Environment is a big one. Health. Physical and mental health. And setting an example for my kids. When my daughter was three, she picked up a bag and got on her bike, and we asked her where she was going. She said "I'm going to work" [139C]

In the 1960s, Betty Friedan (1963) and Hannah Gavron (1966) professed the hidden, taken-for-granted nature of housework, as well as the guilt associated with shortcomings in domestic accomplishment and the fulfilment of the housewife role. This is not so different for some active commuters, who may feel guilty when they don't walk or ride, such as this participant who drove as much as he rode: "oh I've had car guilt, sure. I've had car guilt, yeah" [136A].

Similarly, in the same way that society once saw domestic work as the 'natural' pursuit of women, many now see active transportation as the natural pursuit of the environmentally conscious. "That's *their* thing, not mine." Not unlike the housewife

who, "in the absence of a paycheck to justify her toil… must account for her work in non-economic terms…. a labour of love performed out of devotion to her family" (Seccombe 1974:20), the active commuter must also account for their labour through the various socially prescribed altruisms (e.g. environmental awareness), or assumed self-indulgences (e.g. exercise):

> I feel like it's not always easy, but I feel like I'm doing the right thing. So in that way, I feel… I can get on a moral high horse at times. But at other times, I do feel like I'm looked down on by others [627C]

Policy Implications

If we, as a society, wish to reward socially and environmentally productive behaviour and discourage destructive behaviour, we must consider that different behaviours are associated with different *qualities* and quantities of incentives and disincentives. Not all of these are monetary. For instance, most people choose to drive rather than walk or ride, regardless of existing financial costs (beyond the subsidies), and not for reasons based solely on residential location or social status. Some simply see driving as less work.

Initiating a government system that literally paid pedestrians and cyclists for their commutes could be complicated and administratively costly. A number of governments of various levels have tax incentives and other programs established to encourage employers to compensate their employees for cycling or walking trips (see Litman 2011). However, these programs are often limited in scope, economic impact, and fair distribution. For instance, in the US transportation benefits are exempt from gross income, under Internal Revenue Code Section 132(a); however, the maximum limit per month is $240 for car parking, $125 for transit passes, and $20 for proven cycling expenses (US Department of the Treasury Internal Revenue Service 2011). Clearly this does little to reward active transportation labour. Seeking full compensation based on the accounting methods discussed above may be asking too much in fully automobilized societies, though it would, especially if the revenue were generated through gas taxes, provide a financial incentive for people to live closer to their workplaces thereby reducing overall costs for long-distance transportation infrastructure and the externalities of automobility. Also, as I've argued above, there may be some disadvantages to directly or indirectly evaluating active transportation. What I propose here instead, at least as a

starting point, is a rectification of current transportation budget regimes so that the proportion of funding spent on the active modes is placed at *or above* their annual mode share/split. In this sense, pedestrians and cyclists will at the very least be paid (largely out of their own tax money, see Litman 2004) in infrastructural improvements. These improvements include not only durables such as sidewalks, street furniture, separated bike lanes, etc., but less tangible changes that invert the transportation hierarchy, such as light timing sequences that favour the slower modes.

Walking and cycling are currently undervalued transportation practices, as evidenced by transportation budget allocations, media biases that infer modal invalidity, and survey results. If it is unreasonable to pay people wages to walk or ride, does it behove governments to at least support these mobility practices through budget reallocations (i.e. in lieu of pay)?

My participants' interpretations of active transportation as labour are derived from an interplay of the immediate embodied *feeling* of the activities, past experiences, and socially accrued interpretive frameworks. Therefore, it may be a challenge for those who mostly drive, and seldom walk or ride, to recognize the labour in the movement of active commuters. This driver recognized some value in active mode users' self-propulsion, but also demonstrated how quickly this recognition may be undermined by a subscription to the normative transportation hierarchy:

> I have the utmost respect for cyclists because they're using their own power to get to work or wherever they're going, but when there's two of them on the road, or if they're taking up too much space and slowing down traffic, I find that a bit annoying [384A]

It is worth asking—whose traffic is being slowed, and is that traffic of more value than others? Those who seek improvement in infrastructure and respect for the active modes face an uphill struggle when those whose support they seek lack embodied knowledge of the practices of concern.

These considerations inspire another policy recommendation—an alteration of transportation-related policy analyst and managerial job descriptions to require use of the modes their policies affect. The same way society increasingly views indigenous policy construction as a job best suited to indigenous people, transportation-related planning and

policy should be performed by those with at least some experiential knowledge of the concerned practices beyond simply driving.

Conclusion

Is the motor vehicle yet another manifestation of ill-conceived human attempts to escape "work", either by the individual or as imposed upon another? The same way the robot replaces the maid, who replaces the slave, who replaces a person cleaning up after themselves, perhaps the automobile replaces the horse and chariot, the rickshaw, and simple walking. The whole idea of transportation as labour is compelling in part because people first moved from foot to horse, and bicycle to automobile, for the reduced, immediate, physical work required[12]. As Demerath and Levinger argue: "one of the most significant appeals of car culture has been its promise of exempting a person from the effort of locomotion" (2003:235). To reverse this trend is challenging. It demands that people return to mobility practices where "feelings such as exertion frame the experience" (Spinney 2009:824). Given the larger benefits associated with active transportation, and the current, problematic need to count things of value in order for them to count, it seems reasonable to reward the practices in some way monetarily.

> The basic problem remains how to measure and evaluate human well-being and how to identify those who contribute to it. Though current GNP statistics include what is bad for our health—such as carcinogenic foods—or for the environment—such as the pollution produced by factories—still there is resistance to the measuring of work and production of goods and services that sustain and enhance human well-being. (Benería 1999:305-306)

Environmentally or socially beneficial labours are very much like housework—they clean up the mess of others and are often expected to be provided for free or at low costs. In the same way that "commodities… do not walk into the household and convert themselves into the family's subsistence of their own accord…" (Seccombe 1974:8-9), so too bicycles do not roll into the commute and convert themselves into sustainability of their own accord. Some may dismiss the whole exercise of ascribing value to what is reframed as labour as a 'rhetorical effort' (Shivakumar 1997:374, as quoted in Benería

[12] Drivers too must work to pay for their motor vehicles and the resources required to run them, even if these costs are subsidized by the general public.

1999:304), but if the outcome of the somewhat rhetorical "consciousness raising" exercise is greater respect for active mode users and/or increased active transportation budgets, it may well be worth it.

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Conclusion

This interdisciplinary dissertation synthesizes several theoretical literatures and ethnographic field research to triangulate new understandings and directions in the fields of mobilities, transportation geography, human ecology, environmental epistemology, environmental justice, sustainability studies, social studies of technology studies, and cyborg anthropology. It also experiments with new mobile research methods. Finally, it attends to several practical problems faced by urban and transportation planners, government policy specialists, and environmental and alternative transportation organizations, among them the difficulty in encouraging a shift away from environmentally and socially harmful transportation practices, and offers a number of policy recommendations informed by empirical research.

The chapters draw several major conclusions regarding the co-constitution of technologically mediated mobility practices, social and physical environmental knowledge, policy, and justice. Automobility may in fact alienate both drivers, and to some extent those outside the car, from their physical and social landscapes. The less technologically mediated active transportation modes may increase the sensory and social awareness of pedestrians and cyclists which in turn shapes their commute practices and social integration. If cities want to promote cycling and walking they not only need to reconfigure much of the infrastructural design, but they must also look beyond the physical infrastructure and re-write the laws, policies, and philosophies governing their designs and commuters' behaviour.

In addition to the material presented in the dissertation chapters, I wish to conclude with a range of additional observations, some of which point towards lines of future research. Drivers overall seemed less talkative during their commute recordings, and were more often perplexed with respect to what the research was about and/or what value it could hold. With respect to verbosity, this may be owed to the higher cognitive demands required to travel in a large object at high speed. As for why so many pedestrians and cyclists "got" my research generally, whereas drivers did not, I can only refer back to Jain and Guiver's (2001) contention that the impacts of the automobile can only be known from outside the car. That said, my general impression was that many drivers are quite aware of the problems associated with their mode, but they feel unable to

abandon it owing to various social and infrastructural demands. Key here may be the depth or extent of their awareness; the more they drive, the less *intimately* aware they become of automobility's implications and so the more formidable appear the hurdles.

Almost all participants mentioned the recuperative mental health effects of their commute, though often in different ways. Many people spend their commute time in a state that may be described as anything from meditative to inattentive, though with varying differences in the extent to which the passing environment is involved. Several participants, primarily drivers, mentioned doing their commute almost unconsciously and arriving at their destination and wondering what happened. So perhaps most people aren't very focused on their commute in general. It is secondary to the other things going on in their lives and in their minds. The prevalent use of cellular phones while walking and driving (despite legal condemnation) is perhaps alone evidence of this.

Most pedestrians and cyclists noted automobile traffic noise and smell, and their displeasure at this, but so too did the drivers. The vast majority of motor vehicle commuters in Vancouver drive with their windows up, even in ideal weather conditions[13] so perhaps this is to keep the smell outside. "Why do you keep your window up?" may be a fruitful question to ask in a survey or if driving participants can be more easily recruited.

There are several other promising directions for future papers based on this data, and future research topics. For instance, during their commute narratives many active commuters made many references to clothing—whether or not they or others were dressed appropriately for the weather, activity, or social context, the efficacy of certain types of clothes for walking or cycling, general appreciation of, or outright amusement from, the styles they or others were wearing—whereas drivers seldom did. With respect to ways to encourage mode shift this may be an overlooked subject. Demerath and Levinger (2003) discuss the significance of identity expression amongst pedestrians, who they claim are immersed in a sea of identity cues symbolized through the minutiae of adornment. Cyclists are often characterized as unfashionable Gore-Tex and spandex wearing, helmeted geeks. Young urban hipsters in particular have recently attempted to divest themselves of this stereotype by reusing and redesigning classic nineteenth century

[13] This was an anecdotal observation, but one I feel quite confident about.

cycle wear like tweeds and breeches. Government could address these concerns by offering tax breaks on the production and purchase of practical but fashionable pedestrian and cyclist clothing, rebranding mode shift marketing campaigns with a broader cross-section of identity styles, dropping or altering helmet laws, and requiring practical clothes lockers and changerooms in new developments. I coded a significant amount of my commute narratives with various clothing codes, but did not follow up on this for lack of time.

Somewhat related to the topic of clothing is that of helmets. The presence or absence of helmets on other commuters was a theme that came up repeatedly. Given the contentiousness of the topic, an exploration of dimensions such as risk perception, social movements, identity, and stigma, particularly as they pertain to mode-shift, may be an excellent topic for a future paper. There is a lot to draw on in my data, in my comprehensive exam, in the academic and medical literature, and in the media.

Work in the field also revealed the heterogeneity with which different mode users estimated times or distances between the same locations. Future research that asks participants to estimate the time or distance between two points may reveal interesting mode differences similar to those concerning elevation change discussed in the first chapter. Similarly, participants could be asked what landmarks their home is located near to see if there are modal differences in proximity.

Finally, time permitting, I intend to combine GPS and commute narrative data in a way that allows the researcher to use the route line as a slidable progress bar that links locations with their associated iterations.

Research Process Retrospective

Post-process reflexivity is critical for improving research methods and demonstrating engagement in the field. Therefore, this section outlines a number of points and epiphanies that emerged during fieldwork.

Recruitment

With respect to recruitment, the best advertising methods were postcards (handed out directly to participants at intersections, on bridges and other bottlenecks), word-of-

mouth, Vancity Credit Union ads, and ads in the Georgia Straight. The Vancouver Sun ads, car windshield wiper cards, and community centre posters were generally ineffective. As for the efficacy of advertising, each mode responded best to different means, which of course presents an additional source of selection bias, though the nature of this bias is difficult to identify. Drivers responded far better to Georgia Straight ads than ads in the daily papers, posters in community centres or stores, hand-distributed postcards, or cards left under their wipers. Pedestrians responded best to postcards handed out on the bridges. Cyclists responded to everything. Notable in this latter case were the cyclists responding to my newspaper ads explicitly seeking drivers, and the infectious distribution of my ads in, and by, the cycling community. For instance, someone scanned one of my posters and put it up on a cycling advocacy website. It sometimes felt as though I could simply step outside my door, quietly whisper, "cyclist participants wanted," and I would be inundated with keen interest. The cyclists were so enthusiastic that I had to turn many away. On the other hand, drivers were extremely difficult to recruit. I cannot help but suspect that this reflects the encapsulated orientation of the drivers, especially when trying to recruit by hand-delivered post-card! Participant recruitment flooded and ebbed somewhat unpredictably, but generally people were more available for recruitment during slow times of the year (e.g. the summer), than those busy (e.g. holiday season), as one might expect.

Sample

With respect to the sample, the gender and age of the participants was fairly representative of the City of Vancouver. My questionnaire did not ask questions regarding ethnicity or race but these too seemed relatively representative. The majority of my participants came across as intelligent, curious people, with sympathies toward research. A disproportionate contingent of my sample consisted of professionals and high-level managers, though there were a few blue collar workers in the trades. This may be owed in part to the time demanded to participate and the greater time flexibility of people "who are their own boss". Similarly, the inferred and explicated education of my sample seemed above average. I did not include a formal question regarding education, but this was implicitly revealed either by the person's profession or most often their

explication of the reason why they decided to volunteer, for example, “I did my MA in… and so I’ve always felt obliged to take part in others’ research studies”. Conversely, there seemed a dearth of people with less education, though there were some with high-school graduation. Participant origins and destinations were not particularly polycentric, probably owing to bridge capture and the concentration of pedestrians in the core. Finally, participant transportation histories were messy with multi-mode use the norm rather than exception.

In retrospect, the sample size overshoots qualitative expectations and provides too much good data to fit into three articles, and yet it falls short of quantitative expectations. In the future, unless additional research funds are available to hire assistants, it may be best to recruit a smaller sample for qualitative work or a larger sample for quantitative work. A book publication may be the only way to do this type of ethnographic work justice.

Instruments

The interview instrument was semi-formal in that some questions could be omissible prompts. Whereas I attempted to ask most of the questions, some were omitted depending upon the interview mood, the prior interviewee responses and the time remaining. Participants often tired after an hour of interviewing, as revealed by body language and a deterioration of responses. However, most interviews lasted one to one and a half hours.

The order in which I collected data—two days of commute narratives followed by the interview—proved effective. A number of participants mentioned the benefits of doing the commute narrative first, owing in part to the fact that it “prompted” them on subjects they could talk about in the interview. They’d notice things that they’d once noticed but had since forgotten. Several mentioned that they began to think differently about their commutes after they were forced to verbalize aspects of it. In this sense it “got them thinking”. Similarly, participants tended to be much more spontaneous and candid during their commute narratives than they were in the interview, where it was quite clear some censored or tailored comments. In this respect the *combination* of interviews and commute narratives seemed effective. As suggested in the second chapter,

some driving participants mentioned that they didn't like the commute narrative recording as they felt that their commutes brought out the worst in their personalities—judgemental of others around them, for example—whereas they otherwise saw themselves as accepting, non-judgmental people. Comments such as these, and the differences between the commute narratives and interview data, seem to justify the technique; both data collection environments differ notably and thus reap sometimes contrasting results that speak to things like internal struggles and identity. Unfortunately, as discussed below, the sheer volume and complexity of the commute narrative data precluded thorough analysis that would allow formal comparison between methods in a timely fashion with respect to this doctorate.

Early in the process I abandoned the original plan to pick up the recording devices after the participants had done their commute narrative, listen to the recording, and then do the interview. Instead, I picked up the commute narrative devices when I did the interview. I did this for the convenience of the participants. I soon realized that my method was very time consuming and could be seen as onerous. The elimination of one of the meetings seemed to result in less burdened participants. I explicitly asked three interviewees: "would you prefer that I listen to the recording before we meet? Does the fact that I haven't heard it before the interview insult the work you've done?" Their answers were unanimously no; they preferred the convenience and admitted embarrassment at the idea that I might listen to their commute recordings before meeting with them again. The downside of this change was the inability to tailor my interview questions according to their commute experiences.

Although asking participants to do a "stream of consciousness" for their commute narratives was effective in maintaining a truly open approach, in the minds of the participants the ambiguity of what was sought caused some to estimate themes that the researcher might like to hear, such as traffic conditions or optimal routes. Where "by-catch" is not a problem, this pre-meditated topic circumscription has the benefit of potentially capturing a broad variety of commute experiences, but it also renders comparison between participants challenging, beyond the most generalized themes and abstract codes.

It became apparent that asking the same question, stated in different ways, three times, stretched over the length of the interview, assists in participant recall. When asked the first time, the response is often blank or minimal. By the end the participant is ready with a host of stories. This should be used in any future work, including survey design. The technique of prompting is curious—it leads one to wonder if there are any truly personal thoughts "uninspired" by one's social or physical environment. A person can be "done" talking on a subject, and a few comments from the interviewer can send them off on a whole new direction. Was that thought/feeling just sitting there in the subconscious, waiting to be released when "triggered" or "completed" by outside stimulus or was it an effortful attempt to be a good interviewee?

Another learned practice is the need to ask my core questions "point blank". For the first half of the interviews I attended to some research questions with implicit or adjacent interview questions in an attempt to triangulate without leading the participant. However, by the end of the interview and commute narrative process these concerns were less significant, and their answers to direct questions, when asked, were telling. Similarly, in the future I would like to improve upon my interviewing style by boldly asking uncomfortable or contentious questions rather than worrying excessively about preserving a "good vibe" with the participants. Clearly a balance is desirable in this respect.

GPS data collection was usually straightforward, though a small proportion of the data collected was discarded owing to obvious errors, such as commute paths that did not line up with streets and even intersected buildings at diagonals. For instance, one walking participant's log had them jumping off Burrard Bridge and swimming through False Creek. During the interview they confirmed that they did not do this. Signal reflection from tall buildings and issues with satellites are usually the sources of these errors. Future work would benefit from a temporal link between the GPS log and the voice recorder, so they would be synchronized. Many of the new cellular phones offer that potential through software manipulation.

Finally, there is a tension between the grounded theory imperative to alter questions as incoming results suggest and the need to ossify questions for the sake of comparison. During this research I tried to balance the two by rendering some questions

malleable and others static, but I could not help but wonder: are grounded theory and comparative methods incompatible?

Analysis

Another concern about the comparative method pertains to my sample size. If my small sample size per mode (fifteen each) precludes generalizations (according to positivist perspectives), how can I "compare modes" as though each mode sample is representative? On the one hand I am comparing individual textured responses rather than mode "variables", but on the other I am implying difference between modes. The answer may be that I am not in fact generalizing; in particular, I am not at this stage seeking a monocausal theory to explain difference, but rather a host of social processes be they different or similar across modes. As Steinmetz argues: "given the necessity of reconstructing meaning and of studying the effects of mechanisms in overdetermined, open systems, it is implausible to expect comparisons to be anything other than small-N comparisons" (2004:394).

Coding proceeded at three "levels". The first involved recall of themes from the interviews (possible only for interviewer, me in all cases here) followed by searches for particular references using keyword searches. Recall was often assisted by post-interview journaling. Although the somewhat organic, visceral nature of this approach is appealing, it required a lot of reading owing to the polysemous nature of keyword strings and the context in which they were used. The second process involved coding by interview questions and prompts, and adding annotations and additional codes as needed. Themed data sets would then be printed off by mode and marked up with marginalia. This approach was efficient as the semi-structured interviews organized the data, and hermeneutically advantageous in the way final interpretations were performed on the themes as a whole. However, this approach was not feasible for the commute narratives and still demanded the first process as other references to the formal themes sometimes emerged elsewhere in the body of the interview. The final approach involved detailed idea-by-idea coding. This was in some respects thorough, and somewhat necessary for the commute narratives, but incredibly, even prohibitively time consuming. This method requires multiple sweeps not only to allow "hidden" themes to emerge, but also to grasp

the multiple layers of context in which a thought is formed. I am not happy with the idea of "breaking the data" with strict line-by-line coding as some recommend (see, for example, "open coding" by Strauss and Corbin 1990). Everything is contextual, and breaking it apart may cause the researcher to lose larger pictures in the detail and suffer "word overload" (Miles and Huberman 1984:56). The interview or commute narrative is in some ways a connected whole, where ideas weave through one another. There is an "interview memory" that participants have and an interview builds as it goes along. At times the commute narratives were more like idio-fragments, than conversations. This was what was requested, of course, but it did present coding challenges. Here is an example of the disorganized nature of the commute narratives:

> Trolley bus. Weathervane on top of the condo building. Finally some nice public art. Idiot drivers. There's a bench here in this little park. I've never seen anybody sit at it [173P_CN]

All of the items in this excerpt fall under a general category of "immediate observations". Others switched between times (e.g. past, present, future) and/or spaces (e.g. here, elsewhere), and when time permits I wish to compare this "cognitive location" between modes.

Although formal coding did take place concurrently with the commute narrative and interview process, interpretive feedback to the testing instrument occurred more through the researcher's brain than through formal coding. This was a method both facilitated and necessitated by the involvement of a single researcher versus a team.

An additional interpretive opportunity may be found in member checking and reporting the results of this checking; this is one way to assess the researcher's interpretations and improve the dependability and confirmability of the data (Baxter and Eyles 1997). A member check was performed for the material in the first chapter. Unfortunately the response rate to the member check was low, and all who replied had no contestations about my interpretations. This latter point was interesting, as two of the responses to the member check were from drivers who were, during their commute narratives and interviews, the most defensive about automobility.

GPS log analysis for this dissertation was limited to identification of origin and destination elevations. Further analysis is planned, including production of commute contour cross-sections (these will be posted on my website) and the differences between

these according to mode. Of interest as well is the analysis of the way cyclists and drivers treat stop-signs. Because of the time stamps and frequent location detection in the GPS data, this should be comparable. As mentioned above, a final goal is to link, as well as possible, anonymized commute narratives with their respective anonymized GPS logs. This would provide a significant contribution to the increasingly popular qualitative GIS methodology (Cope and Elwood 2009).

One of the greatest rewards of this research was its challenge—the management of every step of the project was an invaluable learning experience. Though at times the breadth and detail of focus were overwhelming, I now feel better able to realistically scope and operationalize research, including the estimation of cost and time requirements with leeway for contingencies. There is something very exciting about the adventure of field research—anything can happen and surprises are abundant. There are many humorous confrontations with absurdity, such as the discussion about swimming False Creek with the participant whose GPS log was corrupted.

References

Cope, M. and Elwood, S. 2009. *Qualitative GIS: A Mixed Methods Approach*. London: Sage.

Demerath, L., and Levinger, D. 2003. “The Social Qualities of Being on Foot: A Theoretical Analysis of Pedestrian Activity, Community, and Culture.” *City and Community* 2(3):217-237.

Baxter, J. and Eyles, J. 1997. “Evaluating Qualitative Research in Social Geography: Establishing 'Rigour' in Interview Analysis.” *Transactions of the Institute of British Geographers* 22(4):505-25.

Jain, J. and Guiver, J. 2001. “Turning the Car Inside Out: Transport, Equity and Environment.” *Social Policy and Administration* 35(5):569-586.

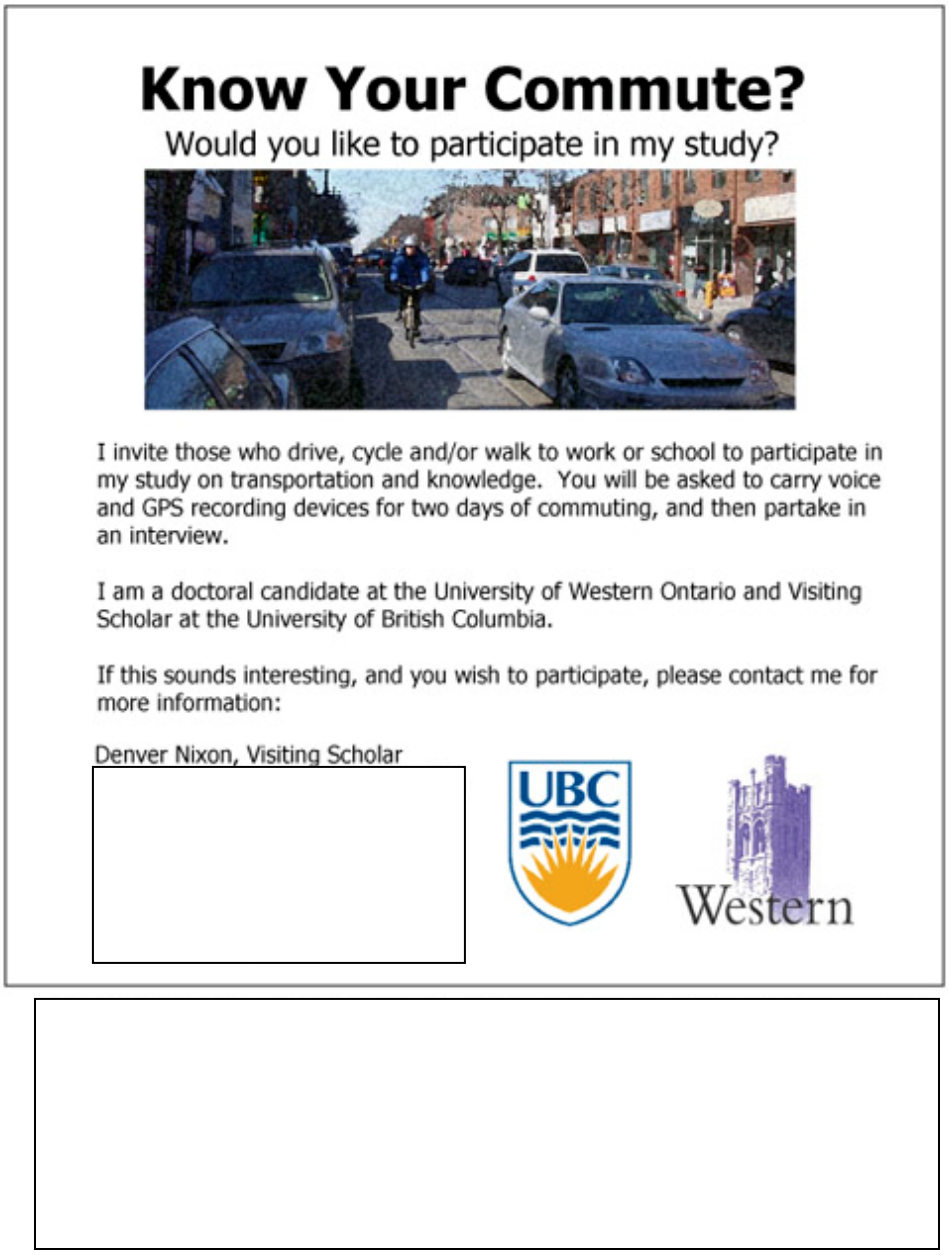
Miles, M. and Huberman, A. 1984. *Qualitative Data Analysis: A Sourcebook of New Methods.* Beverly Hills, CA: Sage.

Steinmetz, G. 2004. “Odious Comparisons: Incommensurability, the Case Study, and ‘Small N’s’ in Sociology” Sociological Theory 22(3):371-400.

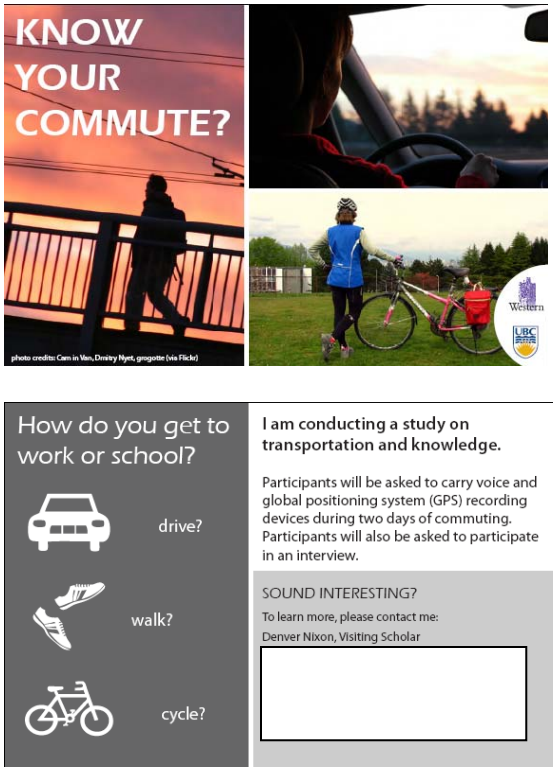
Strauss, A. and Corbin, J. 1990. *Basics of Qualitative Research: Grounded Theory Procedures and Techniques*. London: Sage.

Appendices

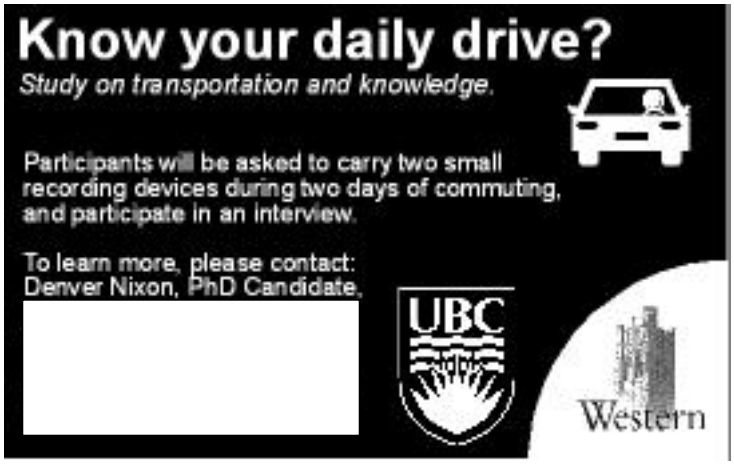
Appendix I: Recruitment Materials



Recruitment Poster



Recruitment postcard, front and back.



Newspaper ads and windshield wiper cards

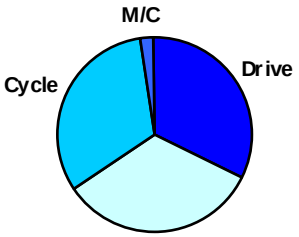
Appendix II: Field Equipment

Olympus ME15 lapel (lavalier) microphone, Olympus VN-5200 PC digital voice recorder, and Qstarz BT-Q1000X GPS data logger. Not shown: Crown Sound Grabber II PZM Microphone (for interviews).

Appendix III: Sample Demographics & Characteristics (Vancouver, BC 2009-2010)

Primary Mode

Drive	15
Cycle	15
Walk	15
Motorcycle	1

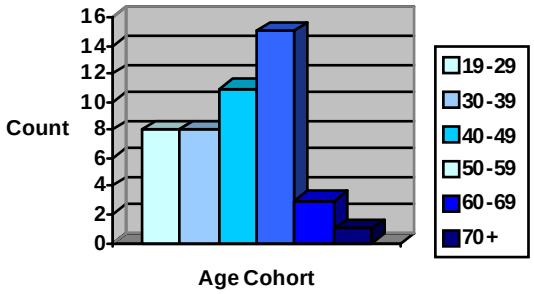


Gender

Female	25
Male	21

Age

19-29	8
30-39	8
40-49	11
50-59	15
60-69	3
70+	1



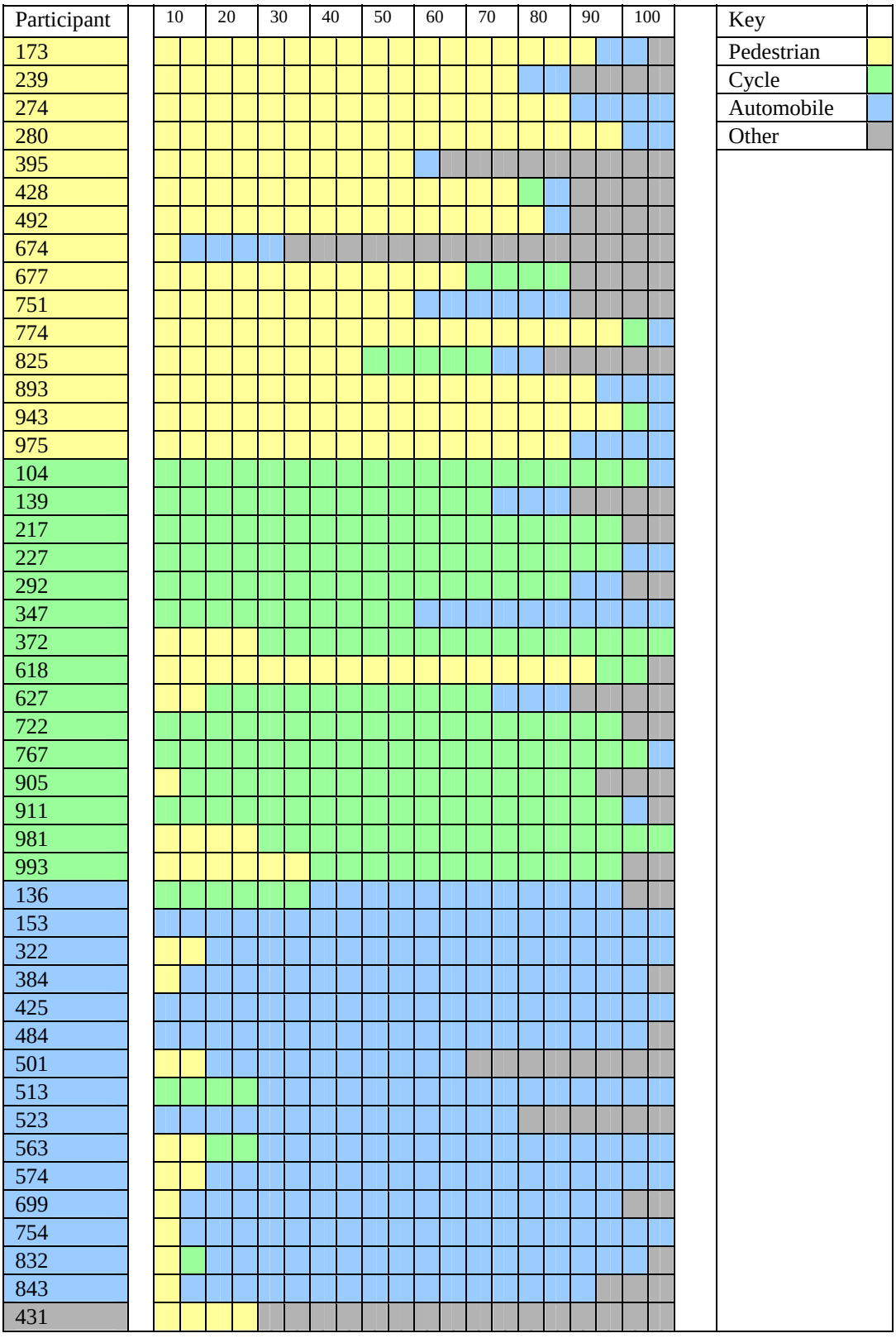
Parental Status

Parent	16
Non-Parent	30

Occupations

Accountant	1	Nurse – Registered	1
Advertising Sales	1	Physician	2
Architect - Intern	1	Physiotherapist & Counsellor	1
Architect – Landscape	1	Pharmacy Technician	1
Artist / Theatre Attendant	1	Plumber	1
Business Analyst	1	Professor	1
Business Owner	1	Registered Massage Ther.	1
CEO Private Org.	1	Researcher	2
CEO Public Org.	1	Research Manager	1
Courier – Bicycle	1	Semi-Retired	1
Driver	1	Stores Person	1
Geographer	1	Student	1
Geologist	1	Student – PhD Candidate	1
Insurance Broker	1	Teacher - Language	1
IT Professional	4	Teacher – Public School	5
Lawyer	2	Transportation Planner	1
Manager – HR	1	Urban Designer	1
Manager – Merchandise	1		
Mechanical Contractor	1		

Mode Split by Designated Mode Affiliation

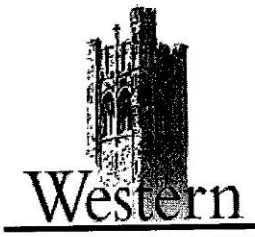


Appendix IV: Interview Question Timeline (next tabloid page).

	431	627	227	347	618	292	173	825	274	239	492	139	484	563	523	905	699	322	674	843	574	911	975	428	832	372	774	722	751	395	217	893	384	943	754	993	153	513	104	767	501	425	136	981	280	677
Interview Date	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####
Describe / tell me about your commute.																																															
Describe your sense of space as you commute.																																															
Tell me about momentum.																																															
Are there people you regularly recognize during your commute because you see them a lot? Do you speak to them? How do you feel about them?																																														
When you were recording your commute narrative, did any significant interactions occur with other modes? Do they ever? Why do you feel these																																														
Is your workplace at a higher or lower elevation than your home?																																														
Why do you choose to commute the way you do?																																														
Describe the sounds of your commute.																																														
Describe the smells of your commute.																																														
Where in your commute is the air most fresh?																																														
How does your commute change throughout the year?																																														
Do any significant interactions occur with other modes?																																														
What can people do to solve global warming? Why do you recommend this approach?																																														
What are the most effective ways to reduce the resource consumption owed to transportation?																																														
Describe any particularly memorable moments experienced during your commtue.																																														
	431	627	227	347	618	292	173	825	274	239	492	139	484	563	523	905	699	322	674	843	574	911	975	428	832	372	774	722	751	395	217	893	384	943	754	993	153	513	104	767	501	425	136	981	280	677
How do you feel your mode, in the current transportation context, effects your health? [Mental health?]																																														
Do other modes of transportation hinder your forward progression?																																														
What is your interpretation of what this study is about?																																														
Do you feel a greater or lesser connection to the environment through which you travel depending upon your mode of transportation? How and in what																																														
Can you tell me about stops and/or traffic circles?																																														
Why do you commute the way you do?																																														
Describe the tastes of your commute.																																														
How does the surface upon which you travel feel?																																														
How much energy does it take to get your groceries from the store to your home?																																														
Should separate bike ways be built if these use up a proportion of the transportation budget normally allocated to automobile infrastructure																																														
Do bicycle have the right to occupy a full lane under the motor vehicle act?																																														
Describe your work place and home locations geographically.																																														
Can you describe your workplace and home locations geographically?																																														
What do you think of [mode other than participants]?																																														
Why do you prefer or not prefer dedicated trails?																																														
Did you stop anywhere, other than for lights, during your commute? If so where? Why? How do you feel about these stops?																																														
When have you felt challenged by the actions of others on the road? In what way? How did these make you feel?																																														

431 627 227 347 618 292 173 825 274 239 492 139 484 563 523 905 699 322 674 843 574 911 975 428 832 372 774 722 751 395 217 893 384 943 754 993 153 513 104 767 501 425 136 981 280 677
What would it take to get you to switch modes? To not switch modes?
Why did you switch modes?
If there are consequences to driving/riding/walking, what are they?
Do you ever talk/speak to the people you see during your commute?
Can you tell me about the wind?
Can you tell me about road rage?
Can you tell me about your sense of safety or lack thereof when you commute?
Why do you choose the route that you choose?
Do you feel your mode gives you a certain status, high or low?
Do you feel like a driver/cyclist/pedestrian?
How do you usually communicate with users of other modes of transportation?
Does your mode make you feel a part of society?
Does your commute ever leave you feeling alientated?
Do you ever feel any sense of mode-related injustice during your commute, or inequality?
Can you tell me about your sense of energy use as you commute?
How do you imagine it feels to be a [user of another mode--driver/cyclist/pedestrian]
431 627 227 347 618 292 173 825 274 239 492 139 484 563 523 905 699 322 674 843 574 911 975 428 832 372 774 722 751 395 217 893 384 943 754 993 153 513 104 767 501 425 136 981 280 677

Appendix V: UWO and UBC Ethics Approval Certificates



Office of Research Ethics

The University of Western Ontario
Room 4180 Support Services Building, London, ON, Canada N6A 5C1
Telephone: (519) 661-3036 Fax: (519) 850-2466 Email: ethics@uwo.ca
Website: www.uwo.ca/research/ethics

Use of Human Subjects - Ethics Approval Notice

Principal Investigator: Dr. J. Parr
Review Number: **15749S** **Review Level:** Full Board
Review Date: February 09, 2009

Protocol Title: Transportation's Role in Mediating Environmental Knowledge.
Department and Institution: Geography, University of Western Ontario
Sponsor: Ontario Graduate Scholarship, U of BC
Ethics Approval Date: February 09, 2009 **Expiry Date:** April 30, 2009
Documents Reviewed and Approved: UWO Protocol, Letter of Information and Consent
Documents Received for Information:

This is to notify you that The University of Western Ontario Research Ethics Board for Non-Medical Research Involving Human Subjects (NMREB) which is organized and operates according to the Tri-Council Policy Statement: Ethical Conduct of Research Involving Humans and the applicable laws and regulations of Ontario has granted approval to the above named research study on the approval date noted above.

This approval shall remain valid until the expiry date noted above assuming timely and acceptable responses to the NMREB's periodic requests for surveillance and monitoring information. If you require an updated approval notice prior to that time you must request it using the UWO Updated Approval Request Form.

During the course of the research, no deviations from, or changes to, the study or consent form may be initiated without prior written approval from the NMREB except when necessary to eliminate immediate hazards to the subject or when the change(s) involve only logistical or administrative aspects of the study (e.g. change of monitor, telephone number). Expedited review of minor change(s) in ongoing studies will be considered. Subjects must receive a copy of the signed information/consent documentation.

Investigators must promptly also report to the NMREB:

a) changes increasing the risk to the participant(s) and/or affecting significantly the conduct of the study;
b) all adverse and unexpected experiences or events that are both serious and unexpected;
c) new information that may adversely affect the safety of the subjects or the conduct of the study.

If these changes/adverse events require a change to the information/consent documentation, and/or recruitment advertisement, the newly revised information/consent documentation, and/or advertisement, must be submitted to this office for approval.

Members of the NMREB who are named as investigators in research studies, or declare a conflict of interest, do not participate in discussion related to, nor vote on, such studies when they are presented to the NMREB.

This is an official document. Please retain the original in your files.

cc: ORE File

The University of British Columbia
Office of Research Services
Behavioural Research Ethics Board
Suite 102, 6190 Agronomy Road, Vancouver, B.C. V6T 1Z3

CERTIFICATE OF APPROVAL - MINIMAL RISK

PRINCIPAL INVESTIGATOR:	INSTITUTION / DEPARTMENT:	UBC BREB NUMBER:
Joy Parr	Others/Other University/Hospital	H09-00563

INSTITUTION(S) WHERE RESEARCH WILL BE CARRIED OUT:

Institution	Site
UBC	Vancouver (excludes UBC Hospital)
N/A	N/A

Other locations where the research will be conducted:
Participants will be recording their commute narratives while commuting throughout the City of Vancouver. Interviews may take place in my office on campus (Mather 141), or at an agreed meeting place (e.g. coffee shop off-campus).

CO-INVESTIGATOR(S):
Denver V. Nixon

SPONSORING AGENCIES:
Ontario Ministry of Training, Colleges and Universities - "Through the Windshield – Coming to Our Senses about Transportation Technologies and Environmental Knowledge"

PROJECT TITLE:
Through the Windshield-- Transportation's Role in Mediating Environmental Knowledge

CERTIFICATE EXPIRY DATE: March 18, 2010

DOCUMENTS INCLUDED IN THIS APPROVAL:		DATE APPROVED: March 18, 2009
Document Name	Version	Date
Protocol:		
Transportation's Role in Mediating Environmental Knowledge-- Research Proposal	UBC1	March 1, 2009
Consent Forms:		
Consent Form	UBC-3	March 18, 2009
Advertisements:		
Print Ad	UBC-C	March 4, 2009
Poster Cyclists	B	March 4, 2009
Poster Drivers	B	March 4, 2009
Poster Pedestrians	B	March 4, 2009
Questionnaire, Questionnaire Cover Letter, Tests:		
Questionnaire	UBC1	March 1, 2009
Potential Interview Questions	UBC1	March 1, 2009
Other Documents:		
UWO NMREB Approval Notice	N/A	February 9, 2009

The application for ethical review and the document(s) listed above have been reviewed and the procedures were found to be acceptable on ethical grounds for research involving human subjects.

Approval is issued on behalf of the Behavioural Research Ethics Board and signed electronically by one of the following:

Dr. M. Judith Lynam, Chair
Dr. Ken Craig, Chair
Dr. Jim Rupert, Associate Chair
Dr. Laurie Ford, Associate Chair
Dr. Anita Ho, Associate Chair

Appendix VI: License/Copyright Information for Chapter 1

Pion Ltd
[addresses deleted]

1 December 2011

Mr Denver V Nixon
[address deleted]

Dear Mr Nixon

Licence to Publish

I attach our Licence to Publish form for you to sign. It is our intention in future to involve the Licence earlier in the publishing process and its wording reflects that intention.

If you have published in an Environment and Planning journal before you will notice that the new Licence is more formal than the document we have hitherto sent you with the proofs although it is, we believe, as short and straightforward as we can reasonably make it. There are some important changes in the new arrangements:

1. We now seek only an exclusive licence to publish your paper; copyright in it remains with you or, if you are not the copyright holder, with the person or institution who is.
2. There is no longer a limit on the number of people to whom you may send the PDF file.
3. As long as you respect an embargo period of a year from publication and the other conditions in clause 4.1 and 4.2 of the Licence you may place your own pre-print or post-print version of the paper (but not our final PDF version) on a free public institutional or subject repository and you no longer need to seek our permission to do that.

I hope all this is clear but shall be happy to answer any questions you may have about it.

Yours sincerely

Karen Stambrovskis
Office and Facilities Manager

EPA R44/452

Appendix VII: Curriculum Vitae

Education

Doctoral Candidate (Geography) **2007 – Current**
University of Western Ontario (London, ON)
Comprehensive Exam Passed With Distinction October 2008

Master of Library and Information Science **2005 – 2006**
University of Western Ontario (London, ON)

Master of Environmental Studies **2000 – 2003**
York University (Toronto, ON)

Bachelor of Science (Geography and Sociology with Distinction) **1990 – 1999**
University of Victoria (Victoria, BC)

Awards

Social Sciences & Humanities Research Council PhD Fellowship ($20,000) **2010 – 2011**

Ontario Graduate Scholarship ($15,000) **2009 – 2010**

Ontario Graduate Scholarship ($15,000) **2008 – 2009**

University of Western Ontario SGPS Graduate Scholarship ($4,000) **2008**

Helen Rodney Memorial Scholarship ($3,300) **2005**

Chinese Scholarship Council Foreign Student Scholarship ($15,000) **2002**

Publications

Refereed:
Nixon, D.V. Forthcoming. “A Sense of Momentum: Mobility Practices and Dis/Embodied Landscapes of Energy Use” *Environment and Planning A.*

Nixon, D.V. 2006. "Environmental Resonance of Daoist Moving Meditations". *Worldviews: Environment, Culture, Religion* 10(3):380-403.

Submitted:
Nixon, D.V. Submitted. “Work to Bike: Should Pedestrians and Cyclists be Paid for their Mobility Labour?” *Antipode*

Book Chapter:
Nixon, D.V. 2010. “附录一：道教无为思想与环境行为学 [*Fulu yi: Daojiao wuwei sixiang yu huanjing xingwei xue* / Appendix 1: The Study of Daoist Non-Action and Environmental Behaviour]” Pp. 511-526 in 道教生态思想研究 [*Daojiao shengtai sixiang yanjiu* /

Studies of Ecological Thoughts in Daoism], edited by Chen Xia, Chen Yun, and Chen Jie. Chengdu: Bashu Publishing House.

Book Reviews:

Nixon, D.V. 2009. "Cycling and Society" [Review of the book *Cycling and Society*]. *Technology and Culture* 50(1):232-233.

Nixon, D.V. 2004. "Techno Woes". [Review of the book *Against the Machine- The Hidden Luddite Tradition in Literature, Art, and Individual Lives*]. *Alternatives Journal*. Posted March 2004 at: http://www.alternativesjournal.ca/issues/302/review_nixon.asp

Media Exposure:

Interview. Kopp, M. 2009. "Quick, Easy, and Efficient: Riding Your Bike." *Yes Mag: The Science Magazine for Adventurous Minds*. Sept./Oct.

Interview. Smith, E. 2009. "Cycling as an Academic Pursuit." *Bike News* 18.

Other:

Nixon, D.V. 2007. "Books or Bytes?". *Librarians Without Borders Resource Centre*. Posted at: http://www.lwb-online.org/old/resources/lwbpubs.html

Nixon, D.V. 2007. "Libraries in War, Civil Unrest, or Political Upheaval". *Librarians Without Borders Resource Centre*. Posted at: http://www.lwb-online.org/old/resources/lwbpubs.html

Invited Talks

"Through the Windshield: Transportation Practices and Dis/Embodied Landscapes." Department of Geography and the Transportation Research Centre, University of Vermont. Burlington, VT, March 25th, 2011.

Conference and Workshop Presentations

"The Social Landscapes of Three Mobility Practices in Vancouver, BC" *American Association of Geographers 2011 Annual Meeting*. Seattle, WA, April 12th-16th, 2010.

"A Sense of Momentum: Mobility Practices and Dis/Embodied Landscapes of Energy Use." *Mobilities in Motion: New Approaches to Emergent and Future Mobilities*, Drexel U. Philadelphia, PA, March 21st-23rd, 2011.

"A Sense of Momentum: Transportation Practices and Kinesthetic Energy Conservation in Vancouver."

1. *American Association of Geographers 2010 Annual Meeting.* Washington, DC, April 14th-18th, 2010.
2. *Graduate Colloquium Series*, Department of Geography, U. of Western Ontario London, ON, April 23rd, 2010.

"Through the Windshield: Coming to Our Senses about Transportation Modes, Environmental Knowledge, and Environmental Justice." *Rounds.* School of Population and Public Health, University of British Columbia. Vancouver, BC, May 15th, 2009.

"Riding With Cars—Researching the Sensuous Knowledge of Bicycling in Automobilized Spaces".

1. *American Association of Geographers 2008 Annual Meeting.*
Boston, Mass., April 15th-19th, 2008.
2. *Towards Carfree Cities VIII 2008 Annual Meeting.*
Portland, OR, June 16th-20th, 2008.

"Goblet Words: Reflexivity and Dialogue in the Research of Daoism".

Canadian Sociology and Anthropology Association 2004 Annual Meeting.
University of Manitoba, Winnipeg, MN, June 4th, 2004.

"The Immediate and Emergent Environmental Benevolence of Qigong Cultivation".

Daoism and the Contemporary World.
Boston University, Boston, USA, June 6th, 2003.

"Anthropocentricism in Industrial Green Design".

4th Biennial Conference of the Canadian Society of Ecological Economics (CANSEE).
McGill University, Montreal, Canada, August 23rd-25th, 2001.

Research Experience

Visiting Scholar **2009 – 2010**
School of Population and Public Health, University of British Columbia

Research Contractor **2007**
Royal Roads University

Research Assistant **2006 – 2007**
Faculty of Information Studies, University of Western Ontario

Visiting Scholar **2002**
Sichuan University (Chengdu, Sichuan Province, PRC)

Graduate Assistant **2000 – 2001**
Faculty of Environmental Studies, York University (Toronto)

Teaching Experience

Lecturer – Geog 2151A *Global Change: Issues & Impacts* **2010**
Department of Geography, University of Western Ontario

Teaching Assistant – Geog 110B *Western Europe* & 148B *Geopolitics* **2008**
Department of Geography, University of Western Ontario

Teaching Assistant – Geog 022F *Society and Nature* **2007**
Department of Geography, University of Western Ontario

Teaching Assistant – Soci 1010 *Sociological Perspectives* **2001 – 2003**
Department of Sociology, York University (Toronto)

Teaching Assistant – Geog 3080 *Reading Landscapes Through Time* **2001**
Department of Geography, York University (Toronto)

Administrative Activity

Graduate Student Representative **2010 – 2011**
Graduate Affairs Committee, Department of Geography, University of Western Ontario

Graduate Student Representative **2001**
FES Graduate Program Curriculum Planning Committee, York University (Toronto)

Additional Relevant Employment Experience

Planning Research Assistant **2007**
Regional Planning Department, Capital Regional District (Victoria, BC)

Co-op Librarian **2005**
Research Library, BC Ministry of Forests and Range (Victoria, BC)

Library Assistant **1991-1999**
McPherson Library, University of Victoria (Victoria, BC)

C.O.S.E.P. Student **1992-1993**
Pacific Forestry Centre, Forestry Canada (Victoria, BC)

Professional Memberships

Canadian Association of Geographers (CAG)
Association of American Geographers (AAG)
Canadian Sociology and Anthropology Association (CSAA)
Environmental Studies Association of Canada (ESAC)
Canadian Library Association (CLA)

Languages

English (Native)
Mandarin (Basic)
Spanish (Basic)