



**Cycling Safety:  
Shifting from an Individual to a  
Social Responsibility Model**

by

**Nancy Smith Lea**

**A thesis submitted in conformity with the requirements  
for the degree of Masters of Arts  
Sociology and Equity Studies in Education  
Ontario Institute for Studies in Education of the  
University of Toronto**

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**Master of Arts, 2001**  
**Nancy Smith Lea**  
**Sociology and Equity Studies in Education**  
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**ABSTRACT**

Two approaches to urban cycling safety were studied. In the individual responsibility model, the onus is on the individual for cycling safety. The social responsibility model takes a more collectivist approach as it argues for structurally enabling distributed responsibility. The framework was developed using principles from feminist theory which relies on a more complex understanding of equality than is currently found in most cycling literature.

A survey administered to 188 people in downtown Toronto, Ontario tested attitudes toward these two approaches and gauged the barriers to cycling for different populations. Women and visible minorities expressed the greatest concerns about participating in urban cycling. Political orientation and cycling status (whether or not respondents were cyclists) were both found to predict the tendency toward a more social versus an individualistic approach to cycling safety. Nevertheless, the majority of respondents endorsed aspects of both approaches. Theoretically and empirically grounded policy conclusions are offered.

## **Abstract**

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## **Acknowledgements**

**This thesis would not have been completed without the input and encouragement of many people.**

**During a provocative workshop they led at City Hall in 1997, Li'Lean Gibbons and Nani Reddy planted the seed to explore the individualistic model of cycling as it manifests itself among different groups.**

**Janet Lo, Sheryl Lousley, Lesley Wood, Sally McKay and David Tomlinson helped me to formulate my ideas and to conceptualize the research study.**

**Daniel Egan, Andy Clarke, John Williams, William Moritz, and Tim Gleason were instrumental in attaining access to difficult-to-find resources.**

**Nancy MacDougall, Derek Chadbourne and Ben Smith Lea provided data collection assistance and Susana La Rosa assisted in fulfilling the thesis technical requirements.**

**William Michelson provided a critical review of my proposal which resulted in a stronger study.**

**Two people in particular were incredibly generous with their time. Patricia Albanese conducted the pilot studies and offered feedback on methodology and design and Sally McKay read the first draft and provided timely and perceptive input.**

**My sisters Barbara Lea and Sharon Mason provided much-needed moral support as did Nancy MacDougall, Sally McKay, Sandra Rechico and Wallace Robinson.**

**Carole Yellin's wise council was invaluable.**

**Marlene Scardamalia was understanding and supportive of my educational venture which took me away from my job one day a week for three years.**

**Angela Miles was a lifesaver when she agreed to be on my committee and her transformative perspective was greatly appreciated.**

**My supervisor Margrit Eichler was a wonderful mix of firm when I lagged, gentle when I became discouraged and always insightful and galvanizing.**

**The spirit and dedication of members of Advocacy for Respect for Cyclists was inspirational and motivated me to continue with this work.**

**Finally, my husband Ben was patient, supportive and never lost faith that I could accomplish what I started. Without him this would not have been possible.**

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## **Introduction**

Shortly after moving to Toronto in 1989, my husband and I began using bicycles, complemented by public transit, as our primary means of transportation due to the traffic congestion and parking problems common downtown. By 1990, we had sold our car. In 1992, and again in 1996, I was hit by a car while cycling. According to a recent coroner's investigation into cycling fatalities and injuries in Toronto, my personal experience is not unusual but indicative of a larger problem. Between 1986 and 1996 there were 47 cyclist fatalities in Toronto and close to 14% of all collisions resulting in personal injury involve cyclists who account for less than 5% of traffic. "This data therefore suggests that there is a disproportionate representation of bicycles in traffic collisions relative to their numbers on the road..." (Lucas, 1998: 7) Although the greatest threat to cyclists lies not with the bicycle itself, but with the motor vehicles travelling in close proximity to cyclists, reports such as these can act to discourage many people from cycling. Others, myself included, feel the issue is so critical to societal and ecological well-being that discontinuing cycling is not an option. Yet as cycling in North America is generally perceived to be quite unsafe, and the data we have (albeit scant) support this perception, it is somewhat surprising that anyone, especially those who have a choice not to, is cycling at all.

My particular focus is urban, utilitarian cycling (as opposed to rural and/ or recreational). Due to its density, the urban environment is conducive to cycling yet is also perceived by many to be hostile because of streets congested with motor vehicle traffic. Those who cycle in this environment must learn adaptive strategies in order to cope and the characteristics of this group and what differentiates them from those who choose not to cycle in the current environment is of interest. The danger in studying these groups however is that it can divert attention away from the social structures in which the majority of people in North America feel they have virtually no choice but to use a car. The social structures in which cycling exists, but are barely acknowledged, need scrutiny and it is the parallels between other groups also operating outside of power that can inform us. Thus, this thesis attempts to situate cycling within a broader context, and within established discourses around social problems (e.g. sexism, racism, classism.)

Chapter 1 is a review of the current literature about cycling with a focus on safety and social issues in the urban environment. A framework is used to situate the literature by classifying the texts within one of two ideologies: individualistic (cycling is an individual choice and safety is an individual responsibility) and collectivist (cycling is determined by social and physical conditions and safety is a social responsibility). Since such a bias is rarely made explicit by authors, this categorization scheme required judgement calls that in several cases were difficult to make. Although speculative, this framework was helpful in considering this literature alongside more explicitly theoretically grounded work, in particular Eichler's (1997) individual and social responsibility models. Although her work is in the area of family policy, nevertheless Eichler's models were very helpful for understanding both the shortcomings of individualistic policies and the advantages of an environment that structurally enables more distributed responsibility. The individual responsibility model relies on a fairly rudimentary concept of equality being equated with sameness while the social responsibility model

embodies a more complex understanding and integration of the principles of equality and specificity. (Miles, 1996) How the debates that occur amongst cyclists (bicycle helmets, bikeways and cycling education) are taken up within the literature is also considered.

One of the debates, cycling education, is the subject of closer examination than the other two. This debate focuses on what role this individual response to safety should play within a society which has virtually no structural supports in place for cycling. The controversy about skills training appears considerably less in the literature than the others and virtually all that is written on this topic is from an individualistic viewpoint, most notably embodied in John Forester Effective Cycling educational program. Chapter 2 explores five pedagogical alternatives which have been successful in other disciplines with a view to how these could be taken up for cycling education. It also documents the quasi-spontaneous yet monthly celebration of cycling called Critical Mass. This leaderless phenomenon nevertheless takes place like clockwork on the last Friday of every month at 6 p.m. in cities around the world. Although the predominant feature of Critical Mass are the bicycle rides, the theory and spirit behind this festive reclaiming of public space embraces a more collectivist operational theory of cycling safety than that which underlies the existing formal cycling training options. Solutions are also offered for how to employ principles of more transformative pedagogical methods to cycling instruction with the aim of reconciling the individual and social responsibility models of cycling.

A shift away from theory takes place in Chapter 3 where the methodology of the thesis project is described. The social structures that exist and the biases that inform these institutions are difficult to access directly. How individuals fare within this system and their attitudes toward the theoretical underpinnings of it are more accessible. Thus a survey was designed and administered to 188 people in the summer of 2000, primarily at two downtown Toronto universities. Attitudes toward the individual and social responsibility models of cycling safety were tested, of cyclists and non-cyclists alike, in an attempt to reach an understanding of what support exists for the two models. Of particular interest is whether base support exists for the social responsibility model which would then warrant the enacting of policies to move us beyond a strictly individualistic approach to cycling safety. Also of interest were the characteristics of those who would like to cycle more than they currently do. As the sample was not random, it was not possible to employ statistical tests of significance but crosstabs and correlation matrices provided sufficient information for useful analysis.

The next two chapters document the findings of the data analysis of the two primary research problems. Chapter 4 examines the attitudes of survey respondents toward two models of cycling: individual and social responsibility. How support for both personal and systemic cycling improvements plays out with the four independent variables (sex, visible minority status, political beliefs and environmental concern) are described. Also considered were differences between groups in response to the suggestion that no improvements may be needed as the current traffic environment could be adequately safe for cyclists.

Chapter 5 describes the barriers and opportunities to encourage utilitarian cycling in Toronto as reported by survey respondents. Concerns were categorized in terms of whether or not they were considered personal problems (eg. individual fitness levels, concerns about appearance, no access to a bicycle, etc.) or social problems which typically fall outside the control of the individual (eg.

distance a person must travel, traffic conditions on routes traveled, etc.) These concerns were analyzed using the independent variables of sex, race, and age. Each variable was also controlled by a fourth variable which was whether or not the respondent was a cyclist. It was believed, and in most cases this was confirmed, that the act of engaging in cycling impacts on an individual's concerns about cycling: both in terms of risk assessment but also in terms of a more in-depth understanding and first-hand experience of the impediments to, as well as the benefits of, cycling in Toronto.

In the concluding remarks, the findings of most significance are recapped, namely the differences between different populations in terms of their concerns about cycling and attitudes expressed toward the individual and social responsibility models of cycling safety. How these findings inform the debates amongst cyclists are also explored. Finally, proposals and guiding principles for moving toward a social responsibility model of cycling are proposed.

# **Chapter 1**

## **Literature Review**

Recently, the Toronto Task Force on Community Safety (City of Toronto, 1998) reported that the top community safety issue identified by citizens and community groups was violence and fear of violence, especially street safety (26%), while traffic safety was sixth at less than 10%. Yet studies have repeatedly shown that random attack is very rare, that crime rates are continually declining and that the total number of traffic fatalities annually in Toronto exceeds the number of homicides. (Toronto Police Service, 1997: On-line) In their survey, the Task Force asked respondents to identify what they considered to be the most important underlying causes of the safety concerns that they had. The majority of respondents saw the root causes as being economic and social (64%), while inadequate policing made up 16% of responses. It stands to reason then, that it should be a far greater political priority to spend public dollars on addressing the root causes threatening personal safety (ie. social programs aimed at alleviating poverty) rather than those which handle only the effects (ie. policing). Nevertheless, the City's overwhelming response to citizen's safety concerns is to allow police budgets to swell while reducing funds for other programs. A police operating budget of \$577,893 was approved for 2000, a 7.4% increase over 1999 (Toronto Police Service, 2000: On-line) "while other departments have been told to cut spending by 5 per cent." (Lakey, 1999: On-line)

There is a parallel situation in the cycling world, albeit much smaller in scope. People's fears of cycling in traffic, although there is evidence to show that they are warranted, is a matter of fierce debate amongst cyclists. The debate tends to stay away from how safe cyclists actually are, partly because this is extremely difficult to measure accurately. Instead, there is considerable discussion about what safety measures should be taken to protect cyclists. Similar to how the response to citizens' concerns about personal safety results in increased police budgets, regardless of the effectiveness of this or the desires of the public, so safety measures are put in place for cyclists, regardless of sufficient proof of their effectiveness and with apparent disregard for the desires of many cyclists themselves. Reaching an understanding of the perspectives of cyclists can best be achieved through listening in on the debates cyclists have amongst themselves.

### **Debates Amongst Cyclists**

There is something to be learned from the debates that rage on between cyclists themselves. This discourse is invisible to many that are outside of this small circle as, being restricted to meetings and e-mail conferences, almost none of it enters the academic literature or mainstream press. I will briefly describe the three current cycling safety measures and the debates that surround them. These are 1) bicycle helmets, 2) bikeways, and 3) bicycle education. Following this section, I will return to these issues in more depth in relation to the academic literature pertaining to urban cycling.

### **1. Bicycle Helmets.**

The most fierce time of debate over helmets in Ontario was in 1991 when provincial legislation was proposed that all cyclists be required to wear them. The law that came into effect in 1995 was amended, as a last minute change, to apply only to cyclists under age 18. If such legislation is enacted, this is generally considered to be the best possible solution because children are more likely to fall off their bikes, and it is falls in which helmets are the most effective.

Many cyclists are opposed to mandatory use of helmets, believing that such legislation is an infringement on personal freedom, a deterrent to cycling, a message to drivers that the safety of cyclists is their own responsibility, and that bicycle helmets have only limited effectiveness (e.g. in low-speed crashes in which no motor vehicle is involved.) Some cyclists object to wearing a device that is intended to protect themselves from dangerous machines used by others, likening it to a hypothetical law which would require women to take self-defense courses to protect themselves from sexual assault.

Those in favour believe that wearing a helmet is just one of many things cyclists should do to prove to other road users that they are responsible, that most head injuries could be prevented with a bicycle helmet and that as health care is socialized in Canada that a law (often compared to seat belt legislation) which claims to reduce medical costs is worthwhile.

### **2. Bikeways.**

Whenever they are asked, the majority of cyclists rank the need for bike lanes and bike paths as an extremely high priority. In fact, a petition with 27,668 names was submitted to Toronto City Council in June, 1993 in support of bike lanes, "the largest petition to be presented to City Council since the Stop the Spadina Expressway Campaign in the 1970s." (Egan, 1993: 12) The primary reason given for such support is a fear of riding in the same traffic lanes as high-speed, high-volume motor vehicle traffic. There is, however, a vocal minority of cyclists who argue that bikeways are more dangerous than riding in traffic and that they should be avoided at all costs. Those who hold this position generally believe that public money for cycling should instead be spent on educating cyclists.

### **3. Cycling Education.**

This safety measure is quite contentious amongst cyclists, something that may come as a surprise to those outside the debates. Although skills training for riding a bicycle is widely accepted as a good idea, especially for children, the politics that surround this issue are considerable. This may be almost entirely due to the fact that funds for cycling are typically extremely tight so the highest priority for those in favour of bicycle education is to seek funds for it, even at the expense of bikeways, and vice versa. However the philosophical division does run deeper and tends to be argued along the same lines as the helmet debate.

Those opposed to bicycle education for cyclists are concerned that safety already rests too heavily at the individual level and that such programs reinforce this. Those who are in favour believe strongly that skills training is the only way cycling can be made a safe activity, especially in North American urban centres, and that bikeways give cyclists a false sense of security. Even if bikeways

were safer, those in favour of cycling education argue that it is physically impossible to have bikeways go wherever a cyclist needs to go so training to ride in traffic is necessary whether bikeways are provided or not.

### How the Debates are taken up in the Academic Literature Pertaining to Urban Cycling

The three safety measures described above are of great concern to cyclists. How they play out within the academic literature is of interest. My literature search focused on recent articles and books about cycling as well as some of the more prominent works of the past three decades. In choosing the more recent literature, I looked for publications that addressed any of the three primary concerns of cyclists and anything that examined group differences or social issues (i.e. the relationship between the user and the facility, the safety and/or desires of the user, etc.) As such it cannot be viewed as a comprehensive review of the literature. I disregarded articles that focused specifically on the technical details and standards of the facilities themselves (i.e. engineering and planning documents). In addition to technical documents, my literature search focused very little in the following areas: recreation, travel, racing, fiction, historical, inventions, mechanics and culture. There are works available that attempt to cover all of these aspects of cycling. The most notable contribution is David Perry's book titled *Bike Cult* (1995) which is a remarkably comprehensive and wide-ranging documentation of events and issues relating to cycling both historical and current.

The literature on cycling is extremely wide-ranging but it is rarely a matter of discussion in the social sciences. However, there is sometimes brief mention of it within the environmental, urban affairs and anti-car literature. (e.g. Jacobs, 1961; Freund, 1993; Zuckerman, 1991; Franklin, 1992) As the environmental and social stresses that result from automobile overuse become increasingly clear, cycling is seen as a sustainable transportation alternative. However, the impediments that stand in the way of a significant modal shift to cycling are typically not considered in any detail within this literature.

Urban planning, transportation engineering, and injury prevention journals frequently publish articles about cycling and my literature review rests heavily on these. Within these disciplines, the bulk of the work is in four areas, three of which roughly correspond to the areas of concern for cyclists: 1) Bicycle Safety (effectiveness of helmets, accident analysis, etc.); 2) Bicycle Education (skills training, etc.); 3) Bicycle Planning (infrastructure designs, user surveys, policy documents, etc.) and 4) Bicycle Encouragement (advocacy, attitudinal surveys, personal health promotion, social, urban and environmental solutions, etc.)

### Individual and Social Responsibility Models

What is remarkable about the cycling literature is how easily it seems to fit within one of two ideologies: 1) Individualistic: cycling is an individual choice and safety is an individual responsibility and, 2) Collectivist: cycling is determined by social and physical conditions and safety is a social responsibility. Eichler's (1997) extensive research into family structures is foundational regarding such splits and it is possible to adapt two of her three models of family structure to this context: *individual responsibility* and *social responsibility*. (Eichler, 1997: 7).

Eichler constructed three models of the family, two of which are based on current and past governmental family policies and a third which outlines more desirable social policies based on lived realities of contemporary families and on rational, just and practical principles which minimize inequality. The first model is the *patriarchal model* of the family, a model based on gender inequality and supported by family policies until about 1970. This model relies on a woman and children being subservient to and economically dependent upon a man who is the head of the household. The *individual responsibility* model is ideologically based on gender equality and is the one that applies most to current governmental policies. Men and women are now both considered responsible for their economic well-being, women are no longer considered dependant and children are, by law, dependants of both parents. The *social responsibility* model has "an ideological commitment to minimizing stratification on the basis of sex." (Eichler, 1997: 16) It legally recognizes functioning relationships as family units, legal marriage being one but not privileged, and the "public shares the responsibility with both parents for the care of dependent children." (Eichler, 1997: 16)

As Eichler's models were developed to explore the relationship between social policy and families, it is not possible to apply them in their entirety or without modification to the subject at hand. However some of Eichler's insights, especially the concept of gender neutrality, regarding the inadequacies and internal contradictions of the *individual responsibility* (IR) model are very helpful for understanding the shortcomings of the individualistic nature of current governmental policies and popular opinion regarding cycling in North America. Furthermore, many of the underlying principles of the *social responsibility* (SR) model are being applied to cycling in some countries outside of North America and have proven to be more just and effective in leading to an increase in cycling. Thus there is evidence that a shift to a SR model for cycling, one in which cyclists' safety is structurally enabled and the responsibility for this safety is shared with non-cyclists, improves the cycling environment. The following section will explore more fully the application of the IR and SR models to cycling.

The underlying ideology of the IR model is one of gender equality. (Eichler, 1997: 88) Although the relationship between cycling and gender is an interesting one and will be explored in more detail in chapters 4 and 5, the fundamental way in which the IR model applies to cycling is in the relationship between bicycles and motor vehicles. The authors who fall into the IR model believe that cyclists are best treated when they are considered equal to motor vehicles and that this should be the aim of policy development and cycling practice. The definition of equality in the IR model is a narrow one: to be considered equal cyclists should receive no special treatment. This viewpoint has strong roots within North America. In Canada, equality is mandated through the *Charter of Rights and Freedoms*. (Eichler, 1997: 88) In fact, Eichler points out that "the fundamental antidiscrimination principle is that likes should be treated alike." (Eichler, 1997: 89) This claim for the necessity of equal treatment is also made explicit for cyclists. The "distinction between socially safe and personally safe behavior is particularly significant for cyclists. They must act as if they were almost as dangerous as a car (how could they expect equal treatment if they did not behave equally?)" (Forester, 1993: 248) Of the cycling literature I reviewed, the bulk of it falls into the IR model and the nationality of most of the authors in this category are either American or Canadian.

The problems inherent in the IR Model are becoming more widely understood, the most important drawback being that there *is* often significant differences between groups. "Equality conceptualized as sameness is manifested in law as gender neutrality. Gender neutrality, however, has been recognized elsewhere as one form of sexism rather than as gender equality." (Eichler, 1997: 89) In fact the concept of equality being equated with sameness seems to be one of several stages that a movement advances through while it is becoming established. Early in the current phase of the feminist movement, feminists strove to prove that they could operate "just like men" thus implicitly relying on the belief that men are somehow better than women and that so-called feminine traits are not worth preserving. Professions dominated by women such as childcare, housework, secretarial work, teaching, nursing, and so on, were devalued by some feminists in the 1970s and 1980s who were convinced that women must engage in "men's" work in order to gain respect. Although it is certainly important that women have equal access to all professions, the more mature feminists have moved beyond this trashing of occupations and activities that are historically associated with women, arguing instead that they be revalued and better remunerated.

An increasing body of academic literature explores the connections between feminisms of "specificity" (or more commonly "difference") and "equality." Miles (1996) describes the process whereby the limitations of equality devoid of specificity have been revealed. "The main divide among feminisms is not between those which affirm "difference" and those which affirm "equality." "It lies between those which insist on a single principle of equality and those which refuse the obvious limits of this frame and attempt to integrate the principles of equality and specificity." (Miles, 1996: 71) As Miles points out, translating this theory into practice is not without its challenges. How can women celebrate their specificity in a world that still does not respect the contributions of women, no matter how valuable they might be, as highly as men's? Efforts to align academic theory with "real-life", though, can only strengthen feminism. By striving to integrate specificity and equality, mature feminisms successfully challenge the one-dimensional patriarchal *modus operandi* of achieving equality only through sameness. To "speak as *women* in the struggle for equality is to challenge the "natural" category "women" as constitutive of dominant and oppressive dualisms." (Miles, 1996:75)

In the anti-racist literature, Toni Morrison (1992) terms the concept of equality achieved only through neutrality or sameness "racial invisibility" and points out that "the habit of ignoring race is understood to be a graceful, even generous, liberal gesture. To notice is to recognize an already discredited difference. To enforce its invisibility through silence is to allow the black body a shadowless participation in the dominant cultural body." (Morrison, 1992: 8) What Morrison is referring to has actually been embodied within curriculum documents in Ontario and elsewhere thus imparting the belief to thousands of students that there is no way, or even any need, to discuss race. As feminism has matured, so has anti-racist pedagogy which provides students with an opportunity to reach an understanding of the implications of racism and the different lived experiences of the dominant white race and that of visible minorities. So "difference" is a crucial component in both the feminist and anti-racist literature. As imbalances of power are related (e.g. race, class and gender), it is not surprising that the issues overlap.

Although it is not often considered in this way, "difference" is also important in terms of transportation. That bikes and cars are not the same is blatantly obvious and transportation neutrality does result in discrimination against cyclists. As bicycles represent only a small minority of traffic, their presence on the roads is at best ignored but more often bicycles are seen as an annoyance and a vocal minority of motorists exists who work toward banning bicycles from public streets. Deliberate transportation planning and policy with bicycles in mind is virtually non-existent. Yet, considering how best to acknowledge the differences between transportation modes is difficult.

There are advantages to the bicycle being considered a vehicle just like any other, as it is presently defined in the Ontario Highway Traffic Act (HTA) and is the predominant method of transportation planners who claim not to differentiate between modes of transport. As a vehicle, bicycles are provided the same rights as motor vehicles and most cyclists would be reluctant to give up these rights. If the HTA was overhauled and cyclists were given special status, there is a legitimate fear amongst cyclists that second-class treatment would result. Many cyclists fear that to admit difference is to admit to being inferior. However, this is clearly a situation in which equality is not the best solution.

The differences between bikes and cars are real and significant. One is encased in two tons of steel, the other is not, one emits harmful emissions, the other emits none, one contributes to a sedentary lifestyle, the other increases activity, one takes up valuable land and resources, the other does not, and so on. The HTA, which instantiates transportation neutrality, ignores the basic societal condition under which cyclists ride--that transportation policies, roads, and laws were all designed for motor vehicles. A bike and a car are not equal so treating them equally does not treat cyclists fairly. Furthermore, the bicycle is clearly a superior form of transportation on several levels: personally, socially, environmentally and economically, yet it effectively enjoys inferior status.

Transportation planning that results in the level of motor vehicle traffic on the roads today is not only socially inequitable but ecologically unsustainable as well. The norm needs to be shifted away from the motor vehicle and toward non-motorized transport and public transit. Transportation policy that reflects the value of increasing cycling and decreasing motoring is an important aspect of implementing this shift. Achieving superior status for non-motorized modes is dependent upon there first being in place an articulation within the HTA, and all other transportation policies and documents, of the specificity of every transportation mode. (This process must not be attempted without the full participation of those who already use alternate modes, as first-hand experience provides a critical understanding of the full spectrum of issues involved.) Such an articulation is also useful for clarifying the characteristics of each mode that by current law should be treated equally. Yet even such an initial, and perhaps obvious, step is difficult to achieve because it entails overcoming the long tradition of transportation neutrality that exists within North American transportation policy. As this notion is in its infancy in North America, it is helpful to turn to models that have a longer tradition. One in which promising changes are happening is in the area of overcoming gender neutrality.

A recent Supreme Court decision (British Columbia, 1999) provides some insight into how to move away from neutrality in terms of gender and is evidence that the IR model is finally being challenged in a serious way. Tawney Meiorin, a forest firefighter, had been performing her job

adequately for 4 years when the BC Government adopted a new series of fitness tests for firefighters. Meiorin passed 3 of the tests but narrowly missed passing the fourth by taking 49.4 seconds longer than was required to complete a 2.5 kilometre run. She was subsequently fired from her job. Several years later, the BC Supreme Court determined that Meiorin should be reinstated to her former position.

Chief Justice Beverley McLachlin, in her judgement, found that, "owing to physiological differences, most women have a lower aerobic capacity than most men and that, unlike most men, most women cannot increase their aerobic capacity enough with training to meet the aerobic standard. No credible evidence showed that the prescribed aerobic capacity was necessary for either men or women to perform the work of a forest firefighter safely and efficiently." (British Columbia, 1999) McLachlin called for a "new model of analysis that avoids the threshold distinction between direct discrimination and adverse effect discrimination and integrates the concept of accommodation..." (British Columbia, 1999) However she warns that accommodation, as it is historically conceived, "appears to be rooted in the formal model of equality" which "is assimilationist. Its goal is to try to make 'different' people fit into existing systems." (British Columbia, 1999)

So accommodation, instead of examining how institutions must be changed in order to make them meaningful for diverse groups, typically only makes adjustments to fit each individual case of discrimination. McLachlin's comments are congruent with anti-racist literature such as bell hooks (hooks, 1988:66-67) in which she discusses the passivity of assimilation and the need for a more radical model in which difference is valued. Such transformation has mostly seemed very far off as many racial (and gender) battles are still being fought at the level of overcoming barriers of exclusion from social and economic power rather than an examination of the system which creates such barriers.

McLachlin recommends a unified approach that has already been adopted in the Ontario Human Rights Code. This approach consists of a three-step test for determining whether an employment standard is a necessary condition of employment or discriminatory, as follows.

"An employer may justify the impugned standard by establishing on the balance of probabilities:

(1) that the employer adopted the standard for a purpose rationally connected to the performance of the job;

(2) that the employer adopted the particular standard in an honest and good faith belief that it was necessary to the fulfillment of that legitimate work-related purpose; and

(3) that the standard is reasonably necessary to the accomplishment of that legitimate work-related purpose. To show that the standard is reasonably necessary, it must be demonstrated that it is impossible to accommodate individual employees sharing the characteristics of the claimant without imposing undue hardship upon the employer." (British Columbia, 1999)

This approach sets in place a new set of standards that have an obligatory awareness of "both the differences between individuals, and differences that characterize groups of individuals." (British

Columbia, 1999) Its relevance to cycling is in the third step. As the stress of riding in traffic is onerous for many cyclists and potential cyclists, urban planners should accommodate these road users by providing facilities to ensure their safe travel, such as by building bikeways. This is not an undue hardship for any city as infrastructure for bicycles is much cheaper than motor vehicle infrastructure. A 1991 analysis conducted on social contributions and costs of cycling in Toronto "found that utilitarian cycling generated considerable economies in areas of infrastructure costs and maintenance when compared to costs based on automobile use..." (Koch, 1992: 190)

McLachlin's ruling essentially formalizes Eichler's social responsibility model because it achieves gender equality without falling back on a gender-neutral approach. (Eichler, 1997: 123) It does this by paying close attention to the specialized skills that are necessarily developed in our highly complex society and thus finds ways to shift "from moving towards a society based on equality to one in which inequality is minimized." (Eichler, 1997: 124) Eichler outlines several "salient dimensions of inequality" (e.g. lifespan, one's body, human worth, reproductive processes, work, etc.) and suggests that they be used to determine whether there are "any differences in the likelihood of survival on the basis of race, sex, sexual orientation, religion, ethnic background, etc..." (Eichler, 1997: 125) The goal of reducing inequality is achieved by first, reducing the inequality within each dimension to its possible minimum, and second, ensuring that placement within one dimension is unrelated to placement within another. McLachlin found that, despite the fact that Meiorin was treated the same as her male counterparts, that the job standards were biased in favour of men. So, to use Eichler's guide to defining a minimally stratified society, gender was found to be predictive of a person's placement within the work dimension, in the case of B.C. forest firefighting.

To situate cycling, then, within Eichler's social responsibility model, it is necessary to compare those who travel by car to those who do not. Within urban centres, more people outside of cars are killed than within cars. Of the 965 traffic fatalities in metropolitan Toronto from 1987-1997, 55% were pedestrians or cyclists (Metro Transportation, 1998) which is evidence that the latter group does not have the same opportunity for reaching their destination alive as those travelling by car. And as a study conducted in Buffalo in the 1970s found, "females, the elderly, the unemployed, and low-income persons [are] disproportionately carless." (Freund & Martin, 1993: 45) So those travelling outside of cars are more likely to be members of historically oppressed groups and are more at risk, despite the fact that they are using modes of transportation which are inherently safe. There appears to be a strong relationship then, between mode of travel and lifespan, arguably the most important of Eichler's dimensions of inequality.

The fact that those using nonmotorized forms of transportation are more at risk than those who do not, is actually not surprising given that transportation infrastructure is overwhelmingly biased in favour of motor vehicles. Special status is not being provided to the superior non-motorized modes because no explicit differentiation is made between road users that have vastly different characteristics. In her excellent essay which critiques planned environments from a feminist perspective, MacGregor (1995) points out that the built environment, if it is considered at all, is generally seen as a benign, anonymous backdrop to everyday life yet it "has been quite literally man made" (MacGregor, 1995: 26) and rests on planning practices grounded in gender (and transport

mode) neutrality. It stands to reason that if those travelling outside of cars were to be treated equitably, that their risk should be reduced to the point at which harm could only be self-induced. According to Tomlinson (2001), the OECD has coined the term "sustainable safety" to describe the "idea that all road users should be equally safe ... and [it] should be a guiding principle in the field of traffic engineering." (Tomlinson, 2001: 77) Although "sustainable safety" is a more progressive idea than those that could be found in most North American transportation planning documents, it still stops short of shifting the norm away from the motor vehicle. Instead of treating modes of transport *equally*, those modes that impose little or no danger on others (either from the vehicle itself or its emissions) and are in fact more beneficial, both individually and to society as a whole, should be given *preferential* treatment.

In urban centres it has been argued that the highest speed permitted should only be that which is within the range of a bicycle. "High speed is the critical factor which makes transportation socially destructive. A true choice among political systems and of desirable social relations is possible only where speed is restrained. Participatory democracy demands low energy technology, and free people must travel the road to productive social relations at the speed of a bicycle." (Illich, 1974: 24) Ivan Illich also points out that humans "are born almost equally mobile... Citizens of a society founded on the notion of equity will demand the protection of this right against any abridgement." (illich, 1974: 79) Reducing motor vehicle speed, then, is socially important because cyclists and pedestrians serve a socially useful purpose. They do so in at least four ways: 1) they use no fossil fuels and create zero emissions; 2) they require very little road infrastructure thus reducing the need for paving over vast amounts of land with its resulting environmental degradation and high cost to the taxpayer; 3) they add human presence to city streets, thus generating vitality and increasing public safety, coined "eyes upon the street" (Jacobs, 1961: 35); and 4) they improve physical fitness thus lowering health care costs associated with obesity and coronary disease, etc. As cyclists and pedestrians are more at risk due to the legal use of dangerous tools in close vicinity to them (i.e. motor vehicles), the SR model would involve a shifting of responsibility for these modes from that of the individual to that of society.

In the next section, I will further explore the parallels between the IR and SR models for the family to cycling by considering the possible relationship between the models and the four areas within the cycling literature (Bicycle Safety, Bicycle Education, Bicycle Planning and Bicycle Encouragement).

### Bicycle Safety

Virtually all of the North American literature on bicycle safety fits into the IR model, especially in terms of accident analysis that focuses on characteristics of vehicle operators. Many authors try to determine that driver error or incompetence is the cause, and therefore the important focus, of traffic collisions. For example, Ratte (1992) conducted a study that found some evidence that Wisconsin cyclists involved in collisions were more likely to be drunk. Summala et al (1996) surmised that bicycle collisions are due to drivers failing to search properly before turning. Garder (1994) found that cyclists are more likely to be at fault than drivers while Rowe et al (1995) found that it is young cyclists who

are at fault, whereas the driver is more often at fault in collisions involving adult cyclists. Cross & Fisher (1977) conducted an influential study which determines the most common types of bicycle/motor vehicle accidents as did Hunter et al (1995). Several studies, typically conducted by coroners and medical professionals, have typed the most common injuries which cyclists receive when they are struck by a motor vehicle. (e.g. Francis & Justason, 1997; Rodgers, 1997; Eilert-Petersson & Schelp, 1997) Eichler (1988) calls this, within a family context, a microstructural bias that places "a *disproportionate* emphasis on psychological variables and a concomitant comparative neglect of macrostructural variables, one of which (but not the only one) is social policy." (Eichler, 1988: 123-124) Studies which restrict themselves to focusing on whether or not cyclists wear helmets, have safety equipment on their bikes, wear reflective clothing, etc. demonstrate a microstructural bias.

Interestingly, European studies are often markedly different from those conducted in North America as the norm shift away from the automobile is well underway in several European countries. The starting premise for many European authors seems to be that a transportation system carrying too many fast-moving vehicles must be flawed, rather than that there is something of particular interest in the millions of drivers worldwide involved in collisions. The leading work in this area is from the UK and is primarily that of John Adams, Mayer Hillman and John Whitelegg. One of their most important findings is that classic traffic safety analysis is flawed because it fails to examine exposure to danger. Although common belief is that infrastructure changes and safety devices have resulted in a reduction in collisions, Hillman, Adams & Whitelegg (1990) show that any improvements are simply due to the fact that people have removed themselves from situations which feel dangerous (i.e. traffic-filled streets). Furthermore, most regulation and public funds spent on safety "is for the benefit of people inside motor vehicles. Comparatively little money or legislative time is spent on the safety of vulnerable road users - pedestrians and cyclists." (Hillman, Adams & Whitelegg, 1990: 18)

Most authors claim that vulnerable road users (cyclists and pedestrians) are overly represented in traffic injuries and fatalities (Hillman et al, 1990; Lucas, 1998) while some argue that if these modes are examined based on distance travelled, that it is actually safer to travel outside of motor vehicles. One such study, from France, demonstrates "that the level of risk run by cyclists is comparable to the risk for motorists and very much lower than that for motorised two-wheeler users." (Carre, 1995: 219) Regardless of whether or not cyclists are more at risk than other road users, there is widespread agreement in the literature that cycling is not inherently dangerous but is a result of conflict with motor-vehicle traffic. This is something that is seemingly obvious yet becomes obscured by the North American focus on cyclists' responsibility for their own safety.

Most of the bicycle safety literature, in fact traffic safety in general, focuses on children. Again there is a split in the literature, dividing along national boundaries, between that which fits with either the IR or SR model. In the former, typical childlike behaviour, such as "running" and "momentary excitement" are identified as the "hazards" causing most traffic collisions. (Canada Safety Council: 1998: On-line) The dangerous characteristics of the automobile, on the other hand, are a given and considered "normal". Those who fit in the SR model determine that fault must be attributed elsewhere, especially to the traffic environment. Adams et al show that traffic injury reductions,

especially for children, have been achieved by successfully removing them from the danger. However, as the danger still exists, and in fact increases as children are no longer independent but must be chauffeured within motor vehicles, these road deaths are not actually lives saved but deferred. "While the death rate for children has almost halved, the rate for 15 to 19 year olds has increased four-fold." (Hillman, Adams & Whitelegg, 1990: 11)

Helmet use is another classic area of study that fits into the IR model. Over the past ten years, the use of helmets amongst cyclists has increased dramatically especially in Canada, U.S.A., Australia and New Zealand. This is partly due to legislation mandating their use (i.e. in Australia, B.C. and Ontario). But voluntary use is also increasing due to wide-spread distribution of studies (the most notable being the 1989 American study by Thompson et al), which report that the "use of helmets has been shown to reduce the risk of serious head injury by up to 85%, and the risk of serious brain injury by nearly 90%." (Millar & Pless, 1997: 37) Several studies have compared injury data before and after the use of helmets became more commonplace (e.g. Scuffham & Langley, 1997; Womack, 1996). These studies generally recommend a mandatory helmet law.

There is a growing body of literature, however, which recommends against mandatory use, and these fit more closely within the SR model. There have been several Australian studies that have attributed reductions in head injuries since the mandatory helmet-wearing law in 1990 not to helmet use but to the reduction in bicycle use. (Robinson, 1996; Cameron et al, 1994) Other studies have shown that helmets are largely ineffective in reducing cycling fatalities as most "occur as a result of head injuries following collision with a motor vehicle, for which the helmet offers little protection." (Hillman, 1992: 328) Such studies have caused other countries to slow down, and in some cases halt, their plans for helmet legislation. In fact, early drafts of the cycling fatalities report of the Toronto Regional Coroner recommended helmet legislation while the final report did not. In the intervening months the Coroner became aware of the Australian helmet studies. His final report concluded that "helmets are an asset, but not a panacea. The helmet does nothing to prevent a collision." (Lucas, 1998: 9) Generally speaking, though, the public belief in safety measures such as helmets is so strong that even once evidence of their effectiveness is challenged, their mandatory use is not repealed. For example, despite the fact that a mandatory helmet law has been implemented in most places for motorcyclists, head injuries are still common and yet the helmet laws remain. (Hillman, 1992: 328)

A series of interesting studies have revealed that if helmet use is to be mandatory for cyclists then it should also be made so for pedestrians and motor vehicle occupants as the majority of injuries incurred by those modes is also to the head. Robinson (1996) determined that a mandatory helmet law for motor vehicle occupants "has the potential to save 17 times as many people from death as a helmet law for cyclists without the adverse effects of discouraging a healthy and pollution free mode of transport." (Robinson, 1996: 463) A British coroner compared head injuries of pedestrians, cyclists and vehicle occupants and found that a similar proportion of the deaths in each category could have been saved with the use of helmets. However, he concluded that "it seems unreasonable to propose that all road users should wear helmets." (Kennedy, 1995: 243) Yet if safety is the primary issue behind their use, why would proposing a mandatory helmet law for both motor vehicle occupants and

pedestrians be considered unreasonable? The promotion of helmet laws for motorcyclists and pedal cyclists seems to be more indicative of an underlying belief that these transportation modes are not "normal" and that those who choose them must be "crazy", than it is a concern for cyclists' safety.

Reliance on safety devices at all has been challenged by Hillman, Adams & Whitelegg (1990) whose theory of risk compensation has revolutionized current beliefs about safety. "Confidence in safety devices - whether they be helmets, seat belts, safety ropes for climbers, or safety nets for trapeze artists - affects behaviour. People respond in a way that tends to nullify the intended effect of the device." (Hillman, Adams & Whitelegg, 1990: 102) Furthermore Hillman argues that it is unjust to put the onus of safety onto cyclists themselves while the primary source of the danger, namely the motor vehicles, remains unchanged. (Hillman, 1992: 329) To this end, Catania argues that any new law to improve safety "should have the primary goal of preventing a citizen from threatening the life of others." (Catania, 1992: 417) Others have argued that the benefits to society must be convincingly demonstrated, and have not yet been, before personal liberties are infringed on by making the use of bike helmets compulsory. (i.e. Unwin, 1993: 271)

Some authors are explicit about the need to balance individual and social responsibility. Illich (1973) characterizes a just society as one in "which liberty for one person is constrained only by the demands created by equal liberty for another. Such a society requires as a precondition an agreement excluding tools that by their very nature prevent such liberty." (Illich, 1973: 41) It is possible to operationalize this type of philosophy as demonstrated in a recent example from the Netherlands.

"Individual interests can conflict with social goals, individuals often have a limited understanding of the social consequences of their actions, and there are large imbalances of power between road-users. Recently, the Netherlands Supreme Court set the tone for social responsibility on the road, when a motorist was declared equally responsible for an accident with an elderly cyclist who crossed the road just at the moment when a car was passing by. In his ruling, the Court stated among other things that a motorist should be expected to adapt his behaviour in response to conditions in which there was a risk that pedestrians could cross the road suddenly. (Supreme Court, 1992). ... Policy geared to road safety must be coordinated with policy aimed at protecting the environment and maintaining acceptable living conditions. This includes promoting the use of bicycles and increasing road safety for cyclists." (Wittink, 1992: 400)

Those who contend that motorists would be more careful if the negative consequences following a collision involving injury, especially of a child, were increased express similar sentiments. "Such a law would rest on the assumption that children should be able to live in residential streets and to behave like children - and that to assume otherwise is irresponsible." (Hillman, Adams & Whitelegg, 1990: 93-94) Mathew describes a road-user hierarchy, established in York, England in 1992, which has "pedestrians, the disabled and cyclists at the top, and long-stay, car-borne commuters and visitors at the bottom." (Mathew, 1997:328) The Toronto coroner's report also recommends such a policy for Ontario: "Ontario's Highway Traffic act presently does little to clarify how bicycles interact with other traffic on our roads. The concept of motorized vehicles yielding to non-motorized vehicles, which in turn must yield to pedestrians seems to be a common sense rule

that should be accepted by all road users. Entrenching this principle in the HTA would clarify the situation, and likely significantly reduce risk of injury and death." (Lucas, 1998: 17)

There are also other solutions that fit within the SR model and are markedly different from those proposed in the IR model (i.e. helmets). These focus on altering the *outside* of motor vehicles, such as large trucks, to make them safer to non-vehicle occupants because as Tolley & Turton (1995) point out "the safest vehicle is a heavy truck, provided that you are in it. If you are not, it is the most dangerous..." (Tolley & Turton, 1995: 317) In Toronto, "a cyclist's collision with a large vehicle is approximately four times more likely to result in cyclist fatality" (Lucas, 1998: 5) than a collision with a car or light truck. Toronto's coroner recommended that "side guards" be installed in all large trucks, trailers and buses operated in urban areas to prevent pedestrians and cyclists being dragged under the rear wheels. Side guards are already mandatory in Finland, Germany, Switzerland and the U.K. (Catania, 1995) Another recent European legislation which requires modification to motor vehicles is the proposed banning of bull bars from the front of motor vehicles. Bull bars are heavy frames seen most frequently on Sports Utility Vehicles (SUVs). Their purpose is to keep brush out of truck's radiators in remote wilderness areas yet SUV are popular in urban settings and are deadly to pedestrians. European countries are looking at not only banning bull bars but also replacing rigid steel bumpers altogether with more flexible plastic ones designed to be crushed in an accident. (Cain, 1999: 20)

### Bicycle Education

Although most of the North American cycling literature rests in the IR model, it is in bicycle education in which the authors are most clearly individualistic. Unlike the other areas which seem to be dominated by non-cyclists, or at least by authors who do not identify themselves as cyclists, those who write about bicycle education tend to be experienced recreational cyclists, or "club" cyclists. Club cyclists are those who have literally joined a club, the most prominent being the League of American Wheelmen (within the past decade, after much controversy, the name was officially changed to League of American Bicyclists but the original name is still widely used). Clubs organize tours and races and also do some advocacy work for utility cyclists. The majority of club members are male and are "well educated, upper-middle income or wealthy suburban whites." (Epperson, 1994: 5)

Despite the fact that individualism is so defining of North American culture, it is interesting to note that within the cycling literature, the proponent of this viewpoint is overwhelmingly that of one man: John Forester. His educational program (called "Effective Cycling" or EC) is widely used throughout North America. Although there are a smattering of authors who can be typified as working within this framework, the influence for their work can usually be traced back to Forester. For example, Tracy (1992: 386) praises Forester's educational approach, especially for adults, and Silvert (1992) describes recreational cycling in Nova Scotia and his involvement in the development of CAN-BIKE, the Canadian version of Effective Cycling (EC) offered through the Canadian Cycling Association (CCA). "The basic concepts of cycling socially as taught in Nova Scotia are those widely accepted throughout North America and identified as the core of John Forester's Effective Cycling program, which is used by the League of American Wheelmen in the United States." (Silvert, 1992:

99) Silvert takes pains to explain that the CCA's adaptation of the course material was primarily to include winter cycling skills and does "not reflect any rejection of the EC philosophy." (Silvert, 1992: 100)

Who is John Forester and how has his training program which is inextricably linked to his controversial personal ideology, come "to become accepted as the leading book and instructional program in cycling"? (Forester, 1993: xvi-xvii) Forester, an American bicycle transportation engineer and avid cyclist (self-described) has written two influential books, one for potential cyclists (1993) and the other for bicycle transportation engineers (1994), in which his theories are elaborated. Forester was born in the UK in 1929 and emigrated to "a conservative upper-suburban area in Southern California" (Forester, 1993: 467) in 1940 (Forester, 2001a: On-line). Forester is many things, but one thing he is not, is shy. He describes himself as follows:

In the most decisive battles of all, I was directly present and prominently active. I killed the first two bikeway standards by showing that they were extremely dangerous to cyclists, and I had the most prominent part in the negotiations that produced the present standard. I took the lead in arguing against the bicycle manufacturers when they tried to make their all-reflector system, without a headlamp, the national legal standard for cycling at night. I started the movement to repeal the mandatory-sidepath laws. I had a large part in creating several of the present traffic laws regarding cycling. I created the Effective Cycling Program. (Forester, 1993: xii)

Although Forester is indisputably a leader in the world of cycling transportation, after reading his books it is difficult not to form the impression that he holds this position primarily because no one else cares to. Forester has an incredible strength of will and an avid interest in cycling that is matched by few others. This could explain how Forester's work, problematic as it is, holds the authority that it does. Both of Forester's books, but especially the one written for engineers, are repetitive, contradictory, opinionated, macho, and dismissive of the concerns and opinions of others. By Forester's own admittance his books and EC program are steeped in controversy. "At times they have both been denounced as dangerous, aggressive, beyond the capability of average humans, elitist, and too complicated." (Forester, 1993: xvii)

Yet Forester is one of only a handful who write about cycling transportation from the vantage point of an experienced cyclist, thus his books are full of useful information regarding bicycle maintenance, touring and skills for riding in traffic and insights into the politics surrounding cycling. Forester is a tireless advocate for cyclists' rights and his web site (Forester, 2001b: On-line) lists 81 cases between 1973 and 2000 in which he has acted as an expert witness (self-described) in legal cases involving cyclists. Although in some of these he assisted the defence thus providing witness *against* cyclists who Forester determined to have acted "improperly", the majority of the cases were situations in which cyclists involved in a collision later sued bicycle manufacturers for inadequate standards of cycling equipment or municipalities for unsafe conditions (i.e. road irregularities, obstructions, etc.) So Forester is highly influential in the cycling world, yet the platforms he holds and his approach are quite contentious.

Forester's technique and ideology is based on his "vehicular-cycling principle" (VC) hypothesis. This "hypothesis says that cyclists fare best when they act and are treated as drivers of

vehicles... Under that principle cyclists can travel with speed and safety almost everywhere the road system goes." (Forester, 1994: 1) He contrasts the VC hypothesis with the more prevalent view which he calls the "cyclist-inferiority superstition" (also "phobia" and "complex") which "says that the roads are too dangerous for cyclists, they cannot operate safely as drivers of vehicles; therefore, so it says, special, safer facilities must be made for cyclists, so that they can ride safely to wherever they might wish to go." (Forester, 1994: 1) Forester recommends this "phobia" should be treated as any other which involves "repeated exposure to the feared condition with successful results, that is without the danger materializing, starting from least-frightening conditions and progressing to most frightening as the treatment proceeds." (Forester, 1994: 8)

It is clear by the way Forester describes the "treatment" for the "phobia", that the VC approach demands an unrealistically high level of commitment and courage from potential cyclists. Those potential cyclists who have transportation choice are more likely to opt for travel by car, or perhaps public transit if it is available, than to cycle under such hostile conditions. There are, however, a growing number of cyclists who cycle even though they do have transportation choice and it is these cyclists that EC targets. In fact, Forester describes those who enroll in his program as follows: "Many vehicular cyclists are engineers, lawyers, doctors, professors, artists, scientists, computer programmers, those in governmental, quasi-governmental, and technical offices... These people tend to think for themselves but to largely agree with social norms about matters other than cycling -- characteristics that reflect the self-reliant, scientifically based, cooperatively self-interested nature of vehicular cycling." (Forester: 1994: 20) Forester is describing people who are comfortable within the social structures that exist and who benefit from them in ways other than transportation. Such people have no desire or reason to shift existing social structures. In other words, they are unlikely to be female, a person of colour, poor or from any other historically oppressed group.

Further evidence for the conjecture that it is only highly motivated potential cyclists, most likely those with disposable incomes, who make the decision to become vehicular cyclists, is the demands required of those enrolled. EC is time-consuming: achieving a satisfactory level of competence through EC training requires 800 miles of riding and takes 3 months. Without EC training, Forester predicts it would take 50,000 miles and 10-20 years to teach the skills to oneself. (Forester, 1993: 271) It is also costly: prices vary but Toronto's CAN-BIKE course (which is offered through the City Cycling Committee and is partially subsidized) costs between \$50 (for 3 hours of training) and \$100 (for 18 hours of training) and the (until recently) required text (*Effective Cycling*) retails presently for \$33.95. The fact that a public institution has adopted standards for all cyclists that are set by an elite group of recreational cyclists should be a matter of some concern.

One of the most contentious positions that Forester takes, which is translated from theory into practice in EC training, is that bikeways are dangerous so potential cyclists need to learn how to ride in close proximity to motor traffic. EC training thus demands that potential cyclists be fit, strong and courageous. "Remember that to develop a cyclist, you must produce both a physiological transformation for speed and endurance, and a mental transformation for traffic perception." (Forester, 1993: 469) Cyclists are thus taught how to "take the lane" when it is unsafe to share safely with a motor vehicle.

**"When the lane is so narrow that an overtaking motorist must use the next lane over, then openly take the whole lane by riding down its center. Whenever you are riding as fast as or faster than traffic, take and use traffic lanes exactly as if you were driving a car... It sounds adventurous. People who don't know will tell you it is dangerous. Militant motorists will accuse you of getting in their way. But it is the safest way to cycle." (Forester, 1993: 295)**

**"Taking the lane" is something many urban cyclists learn how to do, EC trained or not, due to the aggressive nature of urban traffic. However, there are several problems inherent in advocating this position as a necessary component of a cycling program. First, within every society there is a hierarchy in which white, wealthy men are overwhelmingly on top. "Taking the lane" is much easier for this group which already experiences feelings of entitlement. The reality for other groups is that societal norms dictate their deference. The social hierarchy does not disappear when individuals are operating in traffic--especially when the latter group may have no transportation choice and feel marginalized by that. Secondly, it advocates a personal solution to a societal problem. It would not be necessary to "take the lane", thus forcing motorists to move over, if the traffic conditions were such that these road users were already behaving in a safe manner. Thirdly, although being yelled at and having engines gunned behind you, may be a thrill to some adventurous cyclists, it is a confrontation that most cyclists view as unpleasant and would like to avoid. EC thus enshrines in policy an aggressive stance in traffic, one to which those committed to non-violence are philosophically opposed and one that brings no peace to an already turbulent transportation system.**

**Forester, and other EC adherents, insist that bikeways are less safe than cyclists integrating with other traffic, and warns that such facilities are only constructed so as to get cyclists out of the way of motorists. (Forester, 1993: 567) In fact, Forester is so convinced that EC is superior to bikeways that, contrary to virtually every other author writing on the subject, he asserts that EC is an indication that cycling transportation is more advanced in North America than other highly regarded bicycle programs elsewhere.**

**"As happens, the child has now overtaken the parent. American cycling transportation knowledge now far exceeds European knowledge... Particularly in northern Europe (Germany, Holland, Denmark, Scandinavia), bicycle traffic became relegated to second-class status and cyclists acquiesced (even cheered) as they were diverted to bike paths and prohibited from using the better roads. In many of these places they accept slow and dangerous bike-path congestion that would cause American cyclists to rebel, but they do so because the motor traffic congestion makes motoring even less convenient for the short distances involved. America now has the best cycling transportation knowledge in the world, one part of which is in this book." (Forester, 1993: 423-424)**

**Although EC authors dominate the small fraction of North American articles published about cycling education, there is some that fits within the SR model. A German study analyzed accident statistics and found that the tendency to blame children for accidents is flawed because it is not that they are breaking the rules but that accidents involving children "are closely connected with the development of their motor skills and combinations of various motor skills." (Briese, 1992: 298) Briese argues that what children really need is space to develop their motor skills and this is increasingly**

taken away from them by the motor vehicle. Schools would serve children better by reclaiming some of this lost space than by attempting to train motor skills in school. "It's not the lack of traffic education nor a bad curriculum for traffic education which causes the accidents, but rather a traffic configuration which is hostile to children." (Briese, 1992: 299) In Amsterdam, a program to try to get cyclists to obey traffic regulations, is only put in place "following the adaptation of regulation to favour cyclists and the introduction of a new policy to tow away in the first instance any cars which are blocking bicycle routes." (Wittink, 1992: 400)

In general though, effectiveness of cycling education in terms of improving safety has not been adequately demonstrated. Very little "research has been conducted and published to evaluate educational materials once they have been distributed." (Federal Highway Administration, 1993: 117) Cycling education's effectiveness is also limited due to its unpopularity. Surveys reveal that "only 1 per cent of the population is likely to be encouraged to ride a bicycle by the availability of bicycle education classes and programmes." (Clarke, 1992: 193) Education and training is not restricted to cycling but is considered a major component of overall road safety policy. Yet even the UK Department of Transport concedes that "(j)ustification for such measures is claimed on the grounds that 'commonsense suggests that [they] must be in the interests of road safety', but it is conceded that 'no-one has yet been able convincingly to prove it.'" (Hillman, Adams & Whitelegg, 1990: 100)

In fact, there have been several research studies that have shown that education actually *decreases* road safety. One British study of motorcyclists found that "those who have not undergone training actually have less accidents than those who have been trained, because it seems the latter group now take more risks in the belief that they are better equipped to deal with them." (Tolley & Turton, 1995: 320) Another study shows that the long-term effects of road safety education are negligible, especially for young cyclists. Cycling education "can breed responsible attitudes but also overconfidence on the one hand, or insecurity on the other. (McClintock, 1992a: 88) A recent study of 1360 Toronto commuter cyclists which examined exposure and collision rates found that those cyclists "who belong to a club or have taken a course had higher injury and major injury rates compared to those who have not." (Aultman-Hall & Kaltenecker, 1999: 684) Aultman-Hall & Kaltenecker found this result to be counter-intuitive and speculated that it was the injury events that prompted individuals to seek training. This interpretation, while also plausible, is not surprising given the fact that the authors are transportation engineers at Canadian and American universities operating within an IR framework. Surmizing that those who are trained may tend to take greater risks, as their European counterparts have done, is likely an idea these authors would be reluctant to entertain.

A more recent article that Aultman-Hall co-authored studied accident patterns of commuter cyclists. The following conclusions were reached based on the finding that those cyclists who sometimes ride on sidewalks have higher crash rates than those cyclists who do not regardless of where they ride:

"The results of this paper suggest that moving cyclists from roads to nonroad routes would not necessarily lead to a decrease in collisions, falls, or injuries. In place of pursuing segregation of bicycle and vehicular traffic, local planners must consider the following

countermeasures. First, education aiming at improving the skills of cyclists and motorists would improve safety in all riding locations. Second, further study of the conditions of off-road facilities is required to better understand the specific safety issues there. Third, the use of safety devices, such as helmets, must be promoted, and such promotions should emphasize the need for these devices both on- and off-road." (Doherty, Aultman-Hall & Swaynos, 2000: 25)

Generally speaking, there seems to be a general trend in the literature for North American transportation engineers to recommend training and helmets for cyclists while throwing up their hands in defeat that any structural improvements might be possible. Those in the social sciences, on the other hand, tend to rely heavily on engineering solutions to improve cycling safety. There is no small amount of irony that authors so frequently move outside of their areas of expertise thus passing the buck of bicycle safety onto other disciplines. This is likely indicative of the enormity of the dilemma of how best to incorporate bicycles into urban transportation systems currently built around the automobile. As Tomlinson (2001) points out this goes beyond "simply a matter of poor design. In Toronto, and indeed in many cities, the struggle of the individual road user who chooses to travel by bicycle is mirrored by the difficulties faced by any engineer or planner who hopes to see bicycles accommodated in the urban transportation system. It is reflected at every decision-making level. The system--both physical and institutional--seems to have no space for the cyclist." (Tomlinson, 2001: 1)

A few articles critique Forester's EC approach and are written from a feminist perspective. Criticism is directed at the fact that the program is developed by experienced recreational male cyclists who maintain that potential cyclists must achieve a level of proficiency close to their own in order to cycle safely. The basic requirements show "disproportionate results of different groups ... women have a lower ability to generate the high level of strength needed to translate the Effective Cycling program from theory to safe application." (Epperson, 1994: 6) In response to this, the CCA developed a course called "Cycling Freedom" designed for "women who were hesitant to take part in the longer regular club rides." (Silvert, 1992: 100) When offered in Halifax, this course soon became popular with men as well and "was much more effective in attracting participants than the formal CCA course." (Silvert, 1992: 100)

### Bicycle Planning

Most of the literature in this area describes characteristics of different facilities and policies which are planned specifically for bicycles. Forester is fairly alone in his criticism of bicycle facilities. Are bikeways more dangerous? There is insufficient data to back this claim, something which even Forester admits. "Since bikeways won't reduce the number of intersections but make each intersection more dangerous, bikeways are probably more dangerous than roadways. Although this is not direct empirical proof, it supports the vehicular-cycling view that the road system is pretty good and bikeways are worse." (Forester: 1994: 13) The source for much of the data which Forester relied upon was the study conducted by Cross & Fisher (1977) which, according to Forester, found: "Accidents among club cyclists occur somewhat more frequently upon roads with heavy traffic than upon roads with light traffic, but by far the most dangerous facility is the bike path, with an accident

rate 2.6 times that of the average roadway... The most important problem in the American cycling transportation system is the incompetence of cyclists." (Forester, 1993: 262)

It is interesting to note that Forester reports that, even with all their experience, club cyclists are more likely to crash on major arterial streets. Yet he ignores this critical information to concentrate on the bike path findings. Contrary to Forester's interpretation of the Cross & Fisher (1977) data, Cross (1978) reported that the 919 bicycle/motor-vehicle accidents he studied, occurring in four sampling areas in the U.S. in 1975, fails to "support the assumption that a large proportion of bicycle/motor-vehicle accidents result from a lack of basic vehicle-handling skill." (Cross, 1978: 30) He went on to show that although the majority of non-fatal bicycle/motor vehicle accidents occurred on streets with a low speed limit (which is to be expected as this is where the majority of bicycle trips take place), fatalities occur on streets with high-speed traffic and no bicycle facilities. "In contrast, more than half of all fatal accidents occurred on roadways with a speed limit greater than 35 MPH..." (Cross, 1978: 40) As fatalities and/or serious casualties do not typically occur on bikeways, and it is these risks which most cyclists wish to have lessened, Forester's attack on bikeways seems unwarranted.

When studies are conducted to examine bicycle casualty data, they repeatedly find that the majority of casualties are as a result of falls in which no motor vehicle is involved. Forester (1993: 259) and others repeatedly use this information to support their contention that cyclists are a menace to themselves and motor vehicles pose no serious threat. This preoccupation with falls is a red herring. People who have less experience cycling are likely to fall more. They are also more likely to use bike paths. Although not pleasant, such falls are typically of little consequence to people unless serious injury occurs (which to be clear, certainly can and does happen.) The proposal to eliminate bicycle facilities in order to address the problem of cyclists falling is very likely only considered because this type of infrastructure has not yet been fully accepted by transportation professionals. Removing more established types of alternative transportation infrastructure (eg sidewalks or railroad tracks) whenever there is a crash is rarely, if ever, proposed. Common occurrences such as pedestrians stumbling on rough sidewalks eventually lead to the repair of the sidewalk, not the elimination of it. Furthermore it makes little sense to evaluate every time pedestrians trip on sidewalks with the same seriousness as when they are hit by cars while crossing the street. As the former happens more than the later, do we deduce that sidewalks are more dangerous than streets for pedestrians? The inapplicability of one situation to the other is obvious yet somehow a comparable situation concerning cyclists is not challenged.

At about the same time as Cross & Fisher's (1977) study, Jerrold Kaplan (1976) conducted a survey of the League of American Wheelmen (LAW) to develop a profile of "regular" adult cyclists and to gain some understanding about the safety of different facility types (e.g. major streets vs. bike paths). This study had at least one significant flaw: the majority of LAW members are recreational, not utilitarian, cyclists. Also, as mentioned earlier, the typical club member is a white, male professional. Nevertheless, similarly to what Cross & Fisher found, Kaplan's study does not provide evidence that it is more dangerous for these trained cyclists to travel on bikeways than on regular streets, despite the fact that Forester bases his theory of just that on Kaplan's data. (Forester, 1994: 131) Bill Moritz

(1998) contradicts Forester's interpretation in his reporting of his recent replication of Kaplan's survey. "A common misconception is that LAW 74 [this refers to Kaplan's study which surveyed LAW members in 1974] concluded that streets with bike lanes were less safe than streets without bike facilities. This is untrue." (Moritz, 1998: 11)

In addition to updating Kaplan's survey, Moritz expanded on it because as he points out, although injury data are regularly collected on cyclists, the "(o)ne glaring hole in the data is exposure information (e.g. crashes per kilometer) and thus the relative safety of various types of on- and off-road bicycle facilities is virtually unknown." (Moritz, 1998: 2) Despite the problems inherent in duplicating Kaplan's survey that relies completely on the experience of recreational club cyclists, Moritz's study is an important contribution as there was previously very little evidence, either in North America or elsewhere, to demonstrate the safety of bikeways. As expected, the average LAW respondent was a middle-aged, married, male, professional, with a college degree, earning in excess of \$60K/year. (Moritz, 1998: 7) The vast majority used a bicycle for recreation (93%) while only 41% were utility cyclists. (Moritz, 1998: 7) The respondents most often rode on minor streets without bike facilities. Close to a third of respondents reported having some type of accident in that year, most of which happened during on-road recreation. What is striking is that the results show that despite the fact that these cyclists were less likely to ride on major streets, more serious collisions occur there:

"Minor streets are by far the most likely place for a bicycle crash but this should not be surprising since, as noted above, these facilities are used most heavily by these cyclists. The table also reveals that the more serious crashes are more likely to happen on major streets without bike facilities and that off-road/unpaved trails are the scene of about one-quarter of the minor crashes.

Of additional interest is the experience of these cyclists (and indeed those in the two earlier studies) on streets either signed as a bike route or having bike lanes. Crash rates on these facilities are significantly lower than all other facility types." (Moritz, 1998: 11)

So Moritz found that even amongst experienced, albeit recreational, cyclists that riding on bikeways is safer than riding on regular streets. Even Garder et al (1994), who study bicycle safety from within the individual responsibility model, have determined that the problem with separated bike paths is not the facilities themselves but whenever they must intersect with a road carrying motor vehicle traffic and have thus made recommendations for making such locations safer. It is important that such evidence makes it into the hands of bicycle planners, some of whom have relied too heavily in the past upon the facts as presented by Forester and EC supporters, who as a group have historically had much closer access to power than other groups. This is one reason provided by Epperson (1994) that this minority view of EC supporters has so far prevailed: "the experienced club cyclists tended to dominate the traditional channels that government planners and engineers used." (Epperson, 1994: 5)

The other reason given by Epperson that the EC position has been taken as seriously as it has is "more direct: transportation professionals and political decision-makers adopted the view of the anti-planning cyclists because they posed less of a budgetary threat to the existing order of mutual technical/political interests in the transportation field." (Epperson, 1994: 5) In other words, the EC

position does not shift the norm away from the automobile. Toronto is a case in point with its extremely small bicycle facilities budget. The 1999-2002 transportation budget for new projects totals \$901,805 million (M) of which only 3% is set aside for pedestrian infrastructure, cycling facilities, and traffic calming. (Toronto Council Budget Committee, 1999) Cycling is considered such a low priority that politicians gratefully accept reasons to avoid spending in this area.

Some argue that the vehemence with which Forester and other cycling advocates adhere to their positions against bikeways is due to the "poorly conceived, constructed and maintained bicycle paths" (Clarke, 1992: 192) that sprang up in the U.S. following the oil crisis of the 1970s. The result of this is that "(s)pecial facilities for cyclists and cycle planning were given a bad name that persists to the present day." (Clarke, 1992: 192) Adding insult to injury, these substandard facilities were made mandatory in many states until advocates such as Forester fought for such restrictions to be lifted. However, there is evidence to show, in at least one city, that even with these early bicycle facilities there was "a large overall reduction in bike-auto accidents in Davis following bike lane installation." (Lott & Lott, 1976: 178) And there are many bikeways in existence today which work remarkably well. Lowe (1989) describes progress in the Netherlands, a most notable example of a country in which cycling has flourished under strong government support.

In 1986 the Netherlands' cycle paths covered 13,500 kilometers. Perhaps even more significant than this achievement, however, are Dutch efforts to create direct, uninterrupted cycling routes--thus making riding practical, rather than simply getting cyclists out of the way of other traffic. As a result, the share of trips made by bicycle in Dutch towns and cities is typically between 20 and 50 percent. (Lowe, 1989: 35)

Unfortunately for cyclists and potential cyclists in North America, extensive bikeways, a visible indication of political commitment to cycling remains a long way off. For the most part, roads are still designed exclusively for motor vehicles and the anti-bikeway position of ECs makes it easy for planners to continue to ignore the needs of cyclists. The lane widths on existing urban roads are typically wide enough for only one motor vehicle (i.e. not wide enough to share safely with a bicycle). Even if they were wide enough to share, this is an incidental, not a deliberate, benefit to cyclists (in fact many argue that wide curb lanes are detrimental to cyclists because they are conducive to high speeds.) When something is designed in this way, it is just as likely to be re-designed in another way that has no benefit for cyclists. For example, cyclists in Toronto for years relied on parking meters for bike parking because proper bike parking had not kept up with demand. In 1999, without consultation of cyclists or the bicycle planner, the City made the decision to remove thousands of parking meters and replace them with a Pay and Display system consisting of one box per block. Because the parking meters were not officially recognized as bicycle infrastructure, the needs of cyclists were not considered when the proposal for conversion was approved and cyclists were subsequently left stranded with very little bicycle parking. (It was only after the lobbying efforts of cyclists that City Council agreed to rectify the situation through an infusion of emergency cash for the bicycle parking budget.) This is one of the many ways in which cyclists are disadvantaged when they receive no special recognition.

Fortunately, there is a great deal of discussion in the literature about special facilities and policies for bicycles and there are several examples from around the world of cities that have successfully implemented these. Both cyclists and potential cyclists indicate in survey after survey that their cycling is impacted by lack of safe conditions (e.g. Federal Highway Administration, 1993: 1). In 1999, a large-scale survey of Torontonians determined that the number one cycling improvement for 67% of the utilitarian cyclists was more on-street bike lanes. For 66% of non-cyclists and 76% of recreational cyclists, more bike paths and trails were considered the highest priority. (Decima, 2000: 65-67) Not only are bicycle facilities popular but studies have found that they are safer. For example, a study examining the safety of cycling in different countries found significant differences between the Netherlands which has a high proportion of its citizens cycling on specially designed facilities and Britain which has few cyclists and a poorly established cycling infrastructure. A comparison of death and injury rates per 100 million kilometres travelled, revealed that, for both pedestrians and cyclists, death and injury rates "are much lower in the Netherlands than in Britain." (Preston, 1997:42)

Many European countries, most notably the Netherlands, Denmark and Germany, have extensive bikeways and "recent estimates are that from 27% to 50% of all traffic movements in different Dutch cities are made on bicycles." (Osberg & Stiles, 1998: 64) In the U.S., "...cities with higher levels of bicycle commuting have on average 70% more bikeways per roadway mile and six times more bike lanes per arterial mile." (Federal Highway Administration, 1993: 59) In fact, Davis, California, with its extensive bikeways and other bicycle-friendly features, has an astounding 25% of its population that commutes by bicycle (Federal Highway Administration, 1993: 51) compared to the national average of less than 1 percent. (Clarke, 1992: 191)

However, bicycle planning is not simply about bikeways. There are a range of ways in which bicycle travel can be encouraged, some give cyclists priority over other travel modes and others exempt them from restrictions designed specifically for motor vehicles. For example, a right-of-way hierarchy as described in the Bicycle Safety section above clarifies interactions between road users. Advanced stop lines and waiting areas for bikes at traffic lights are used in the UK, Belgium and the Netherlands. (Riley, 1996; Catania, 1995) Contra-flow lanes are common in the UK, Netherlands, Switzerland, Germany and Oregon. (McClintockb, 1992; Clarke, 1992) Special priorities for cyclists (e.g. providing cyclists with extra time to negotiate the intersections ahead of drivers or giving right of way to cyclists over motor vehicles where a bikeway meets another street) are in place in the UK, Netherlands, Denmark and Italy. (Lester, 1992; McClintock, 1992b; Catania, 1995) In France, a motor vehicle overtaking a cyclist must keep a distance of 1 meter. (Catania, 1995: 222) This is also recommended in the Toronto coroner's report. (Lucas, 1998: 33) Exempting cyclists from coming to a full stop at stop signs is formalized in Idaho's Traffic Act (Idaho Legislature, 1999: On-line) California has reduced fines for traffic offenses committed while on a bicycle (Forester, 1994: 232) and this has also received consideration in Vancouver. (Laidlaw & Whistler, 1992: 465)

Of even greater importance than these measures is the necessity of explicit plans to reduce both motor vehicle speeds and volume. Although outside the scope of most bicycle planners' job descriptions, there is widespread agreement that "policies to encourage bicycle transportation must

be geared towards discouraging other modes, specifically the automobile." (Noland, 1992: 348; Also Hulsmann, 1997 ) In fact some insist that doing one without the other is futile. (Tolley, 1992: 266) The simplest and most effective way to reduce automobile traffic and encourage modal shift is to reduce parking supply. (Welleman, 1997; Carre, 1995; Mathew, 1997; Hormann, 1992; Tolley & Turton; van Werven, 1992; Hillman, 1997)

In conjunction with reducing the amount of motor vehicle traffic, reducing its speed is critical. Much of the literature argues that doing so is the most essential component of bicycle planning. (Tolley, 1992; Noland, 1992; Hillman, 1992; Wittink, 1992; Bach & Diepens, 1992; Whitelegg, 1993) In fact, studies have confirmed that high motor vehicle speeds are the greatest safety threat to cyclists. (McClintock, 1992a; Illich, 1974) Interestingly, it has been found that if cars can be "calmed" enough, that no special bicycle facilities are needed at all. (Tolley & Turton, 1995; Tolley, 1997; Welleman, 1997; McClintock, 1992a) There is also an important connection between motor vehicle speed and space – the faster the cars go the more space they take up and the more dangerous it is for other road users. Illich calls the way cars monopolize traffic a radical monopoly, one which "destroys the environment for feet and bicycles." (Illich, 1973: 55) Even if their polluting emissions could be reduced, as is the focus of technical fixes such as electric cars, " ...their inhuman velocities would degrade man's innate mobility" and would do nothing to reduce the amount of time that many North Americans spend on travel.

For years, European cities such as Groningen and Nurnberg have been restricting non-essential traffic from their downtown cores. Despite the initial reaction of alarm from some citizens, especially business owners, the end result is something that is positive for everyone. In Groningen, business in shops in the city centre increased and the modal split shows a significant shift. It is now "cyclists 48%, cars 30%, pedestrians 17%, public transport 5%." (Hormann, 1992: 456) In Nurnberg, after pedestrianization in which no roads were constructed to take the 10,000 vehicles that had previously travelled on the affected streets every day, shops are conducting their business as normal and "80% of the vehicles could not be accounted for in parallel streets." (Roberts, 1992: 249)

Such accounts of "disappearing traffic" are particularly powerful when viewed in conjunction with the increasing evidence that new roads do not ease congestion but actually generate more traffic. (Whitelegg, 1997: 14) Simply put, people will drive if the infrastructure is in place for them to do so and if no other option is supported. Once this is shifted, especially if both encouraging cycling and discouraging travel by car is done in concert, people stop driving. Although sometimes politically difficult to initially implement, the "need to provide for the cyclist by taking space away from the driver is now more widely appreciated..." (McClintock, 1992b: 33) This very policy, of taking funds previously dedicated to worsening conditions for cyclists and pedestrians (i.e. street widening, parking, etc.) and shifting it to funds to improve the physical environment for those modes, was recommended by Jane Jacobs nearly 40 years ago. (Jacobs, 1961: 363)

### Bicycle Encouragement

With the exception of bicycle clubs, ECs are wary of encouraging potential cyclists to ride. This is due to the fact that their approach, which requires EC training before beginning, is

inconsistent with the casual nature of most potential cyclists. In fact, Forester argues that "non-cyclists lack the attitudes, skill, physical endurance, and equipment for cycling; it is impossible for them to attempt normal cycling activities and achieve satisfying results." (Forester, 1994: 196) Forester believes that instead of encouraging people to cycle, public funds should be spent on "increasing the proficiency of present cyclists ... (as) it is not so obvious that America is in such serious and immediate trouble that it would benefit from a large increase in cycling at the present high accident rates or the even higher rate that would be incurred if a large number of persons were rapidly attracted to cycling." (Forester, 1994: 196) Forester's belief that an increase in cycling would result in more accidents is not borne out in reality. A study of 80 European towns and cities found that cyclists are safer in locations with a high proportion of bicycle traffic. "This is contrary to a common attitude among many 'traditional' traffic planners that any encouragement to people to cycle will inevitably mean more accidents. (McClintock, 1992a:85)

Again, Forester stands alone in his opinions. The vast majority of the literature asserts that encouraging cycling is an important policy decision. However, those authors who concentrate on bicycle encouragement do not necessarily fall easily within the social responsibility model because the focus tends to stay at the individual level. Such studies examine characteristics of cyclists and potential cyclists through attitudinal surveys or patterns of use analysis. (Moritz, 1998; Moritz, 1997; Noland, 1992; Go for Green, 1998, Jackson & Ruehr, 1998, Joshi & Beckett, 1992; Beck & Immers, 1994; Shafizadeh & Niemeier, 1997; Antonakos, 1994; Aultman-Hall & Hall, 1998; Nelson & Allen, 1997; Hope, 1994; Hunter & Huang, 1995; Antonakos, 1995)

One study of interest looked at cyclists' perceptions of risk and found that the "more competent a bicyclist, the lower his/her perception of risk... (and) the greater the perceived benefit, the lower the perception of risk." (Noland, 1992: 347) This could go a long way to explaining why experienced, dedicated cyclists have such difficulty in supporting measures to reduce their risk, such as bikeways, and have long since forgotten how important such measures were when they were novice cyclists. Another notable result of this study was the finding that cyclists who use helmets have "a higher perception of the risk of bicycling. This indicates that those taking protective measures to reduce their risk have higher levels of perceived risk. (Noland, 1992: 347) This perhaps seems obvious but is worth mentioning because it could explain why helmet use is so prevalent in North America but virtually non-existent in countries with high cycle use, such as the Netherlands and Denmark. The distinction is not so much between responsible and irresponsible cyclists as it is between cyclists who feel at risk and those who do not.

### Conclusion

This chapter has contained a fairly comprehensive review of the current cycling literature. As well, feminist and anti-racist thought were touched on in order to explore the idea that these disciplines have developed a deep understanding of the critical need for a norm shift and have moved to a more complex understanding of equality thus highlighting the need for the cycling literature, if it is to mature, to do the same. The placement of individual pieces of literature into either the individual or social responsibility models was done by me and may, or may not, do justice to the

authors. However it does provide a useful context for trying to understand the philosophical approaches which lie behind the words of authors as such belief systems are rarely made explicit, especially in the academic literature.

My approach is quite decidedly informed by the fact that I have first-hand knowledge of cycling in both highly individualistic societies as well as in those places (eg the Netherlands, Belgium, Germany and Denmark) that take a more collective approach to safety. The latter, in my opinion, is definitely superior especially for the "ordinary" cyclist. I have attempted to lay out clearly why it is that such a position is strangely (to my mind) contentious for those operating within an individual responsibility model, the vehicular cycling approach being the primary example of this. My goal in this chapter and throughout this thesis is to try to present both models in the fairest way possible yet I acknowledge that as a cyclist engaged in these debates I am not neutral regarding this issue. To add to the complexity are the different operating belief systems which we all hold and the difficulty in bridging the gaps between differing perceptions of risk and conflicting definitions of safety. Although my belief is that employing the social responsibility model results in a safer cycling environment and that North American cities should move in this direction, I am also committed to finding ways to find some common ground between the two approaches to cycling safety. This will be explored further in the next chapter.

## Chapter 2

### Cycling Education: Can the Pedagogy Become More Transformative?

The highly charged environment around cycling education, due to its individualistic and ideological base grounded in John Forester's teachings, does seem to point to the need for a reworking of this essential instruction. This chapter explores some opportunities for change by looking at five pedagogical alternatives that have been successful in other disciplines. It also describes a position that is more consistent with the social responsibility model: the grassroots movement of cyclists who are articulating a position originating from a very different belief system than that espoused by John Forester and the vehicular cycling program. It is important to do so because this viewpoint has scarcely been documented and it is only by reaching an understanding of how it is exemplified, that a position drawing from both operating models can be developed.

#### Pedagogical Alternatives

Five pedagogical alternatives from different disciplines (eg. cognitive science, adult education, feminism, anti-racism) have influenced me to develop my own particular lens as an educator committed to the principles of non-violence, participatory democracy, active inclusion and to transformative education resulting in social change. It is possible to see the areas of overlap between the alternative pedagogies described, especially in their unanimity in validating that there are other routes to knowledge apart from the traditional method of teaching via transmission. There is also a healthy questioning of and resistance to the western scientific framework which is so endemic in contemporary education that it is difficult for those enculturated within it (myself included) to even recognize it as being one approach among many. Applying any of these alternatives to cycling education would result in a dramatically different teaching and learning framework than John Forester's *Effective Cycling* approach.

#### 1. From Transmission to Constructivism

Traditional teaching methods employ what is called the transmission model in which the mind is conceived of as a container to be filled by experts. This method relies on the belief that the knowledge of the expert (typically the teacher) can be transmitted to the mind of the novice (student) primarily via the spoken word (eg class lecture). While the transmission model is perhaps the easiest from the instructor's standpoint, many educators believe it is not the most advantageous way to learn. A significant body of research has been built up, especially in cognitive science, which shows that the constructivist model in which "knowledge is produced within the mind through mental activities of the learner" (Bereiter & Scardamalia, 1996: 486) is much more effective. A constructivist approach is more likely to result in "intentional learners" (Bereiter & Scardamalia, 1989), who "are more inclined to pursue understanding even in unsupportive circumstances." (Scardamalia & Bereiter, 1996: 154) Unlike the hierarchical structure of the transmission model, constructivism draws on community-based knowledge.

## 2. Knowledge-Building

Scardamalia and Bereiter turn the notion of expertise on its head. Instead of expertise being held by only a privileged few, they have shown that all learners in a community can participate in the process of expertise. All participants are encouraged to take charge of their own learning and to engage in discourse that results in progressive refinement of ideas, resulting in what Scardamalia and Bereiter have called "knowledge-building." A pedagogy committed to knowledge-building recognizes that within any community there is a diversity of ideas, the "focus is on collective responsibility and continual advancement of ideas ... and conflicting views and contradictory methods can be rethought for their potential to complement and expand shared knowledge." (Scardamalia & Bereiter, 1996: 36) This is very different from the notion of an expert transmitting one set of ideas and beliefs into the minds of the learner. Scardamalia (1999) writes: "A hallmark of engagement in a knowledge building community is the production of ideas of value to others, not simply demonstrations of personal achievement. To accomplish this a shift is needed, from primary focus on individual performance to community knowledge jointly constructed." This leads to distributed, opportunistic knowledge which rests on the principle that there "is not a hierarchical knowledge relationship between those who know and those who need to know; different agendas and different needs create a productive tension that helps refine goals and means for achieving them." (Scardamalia, 1999)

## 3. Transformative Learning

A significant body of the transformative learning literature (also referred to as popular education), like constructivism and knowledge-building, encourages learners to take responsibility for their own learning and to take a critical approach to the curriculum and the learning environment. Transformative learning differs in that it tends to be a more holistic approach, making the links between the mind, body and the rest of nature overt. There is also recognition embedded in the transformative learning process that education is political, not neutral. Transformative learning is dedicated to shifting systems of power and to education serving a liberating function instead of supporting the status quo as most pedagogical approaches do. It also recognizes that social order is important but not at the expense of social justice and sees education at its most effective when it is linked to social action. The work of a Brazilian educator, Paulo Freire (1970), is perhaps the most influential in this area providing us with a rich grounding in critical thought as applied to education. Freire coined the "banking" concept of education through which he critiques the practice of those educators who operate as if they are making "deposits" into the minds of the learner. The "banking" concept parallels the transmission model's "mind-as-container" metaphor. Freire's alternative to this traditional style of teaching is called "praxis" which signifies the ability of humans to transform reality through reflection and action.

## 4. Eco-Feminism

Feminism, especially as it relates to environmentalism, is another important strand of thought which runs counter to the transmission model of teaching and which has been influential in shaping

my thinking. There has been a strong crossover between the environmental, peace and women's movements, so much so that in the late 1970s a new term developed: "ecofeminism". Mies & Shiva (1993) describe ecofeminism as being "about connectedness and wholeness of theory and practice." (Mies & Shiva, 1993:14) Ecofeminists see ecological destruction and war as the same manifestation of patriarchal violence as the historical dominance of men over women. Seager (1993) points out that some of the early environmental groups made an "explicit commitment to feminist principles. Their principles of nonexploitation, nonviolence, and the vision of a future based on harmony with nature, not domination of it, drew directly from the women's movement, which had emerged as a political force during the previous decade." (Seager, 1993:169) As the expert scientific institutional structure which "control our collective environmental fate are constructs of male culture" (Seager, 1993:169), many consider woman's social location to be an essential factor within environmentalism.

### 5. Anti-Racist Education

Finally, anti-racist education not only critiques the fact that most pedagogy is defined by men but that these men are primarily white. Their theories are informed by their values, which may be very different from those operating out of different social locations. The white male has been especially associated with the way in which western science has been established. According to Dei (1998), western science is characterized by its belief in such things as universalized knowledge; a controllable and ordered universe; written, factual content as truths; absolute certainty of knowledge; atomization; and autonomy of the individual. By contrast, one of the defining features of indigenous knowledge is the belief in the uncertainty of all knowledge (Ermine, 1995). Barnhardt and Harrison (1993) describe ten distinguishing characteristics of indigenous education initiatives, some of which are: commitment to community and communal development (as opposed to the individual); knowledge is viewed in a holistic framework achieved through minimal hierarchy; spirituality harmony; and emphasis on orality over literacy.

### Cycling as Transformative: An Alternative Operational Theory

Cycling education is almost completely skills based. A common perception exists in the mainstream that skills-based programs are value-free. This perception is not as prevalent amongst less dominant groups. Graveline, (1998) for example, an Aboriginal educator, describes her observation that "[c]ompetence means not only learning specific skills, but also acquiring the knowledge or theory base of the discipline, almost all of which is generated by middle-class, urban, White, male theorists. Skills and curriculum are based on notions of commonality within the human experience, and they tend to apply personal solutions to socio-structural problems. Little awareness of cultural diversity is present." (Graveline, 1998:9) There is widespread agreement that schools impart values, biases and even misconceptions along with knowledge. However, it is more difficult, especially for those within the dominant groups, to see where biases might be inherent within skills training.

Most people would probably be surprised to learn that there is a theoretical framework for cycling training courses. Furthermore, even those who are aware likely underestimate the significance

this framework can have, attached as it is to something as simple as the instruction for learning how to ride a bike. However the cycling education programs employed in much of North America are derived from John Forester's Effective Cycling program which uses a pedagogical framework based on a highly ideological theoretical grounding, as described in detail in Chapter 1. That critique directly confronted the macho and individualistic nature of Forester's theory. In this chapter the critique is more oblique. A more grassroots approach to urban transportational cycling is presented which, although not an educational program *per se*, nevertheless provides evidence that a significant percentage of the cycling community has a different, more transformative, operating theory incompatible with the worldview embodied in the Effective Cycling program. Within this operating theory the bicycle is a transformative tool, and can be seen to embody feminist principles such as non-violence and non-exploitation. This approach reflects many characteristics consistent with a social responsibility approach to safety. This theory is implicit in the practice of Critical Mass bicycle rides.

### Critical Mass Bicycle Rides

Critical Mass (CM) is somewhat easier to explain by what it is not, than what it is. It is not an organization or group, has no leaders, no set agenda and no formal rules. Rather it is a celebration of bicycling which is embodied in a somewhat anarchic party on two wheels. Even so, it has evolved into a worldwide phenomenon consisting of bicycle rides that take place like clockwork (referred to as "organized coincidences") on the last Friday of every month at 6 p.m. in hundreds of Canadian, U.S., European and Australian cities. Rides vary in size depending on the city but numbers have reached 7,000 in San Francisco. CM was started by about 60 cyclists in San Francisco in 1992 as a way to bring the cycling community together in a festive reclaiming of public space. Chris Carlsson, one of the co-founders describes it well. "People always assume that Critical Mass is fundamentally about bicycles. Well yes it is. It's sort of inescapably about bicycles but to reduce it to bicycling is also to miss critical elements of it. This exhilaration, this open-endedness, the human creativity that was unleashed by this experience I think has as much or more to do, really more to do, with being in a new kind of public space." (White, 1999) The idea has caught the imagination of cyclists all over the world primarily by word of mouth.

The name Critical Mass originated in a documentary about cycling where George Bliss, a New Yorker visiting China describes the way cyclists depend on each other's presence to operate within a transportation system devoid of traffic lights, a method which actually seems to result in remarkably few collisions. "Buses, taxicabs and motorcycles coming through intersections with no traffic lights and this kind of innate ability that they've developed over time to make that work but there are rules operating under the surface that worked very well. There was a kind of a critical mass thing where all the cyclists would pile up and then go. All the cyclists that were turning left at an intersection would wait in the middle until they had enough numbers to force through the cars and make them stop." (White, 1992) In San Francisco, the riders in Critical Mass without previously knowing about this practice had discovered it through trial and error and found it to be the safest way to hold the density of the mass together even though it meant traffic lights became irrelevant. Unless traffic lights are

already red when the front of the ride reaches them, the ride continues through intersections because individual riders have become transformed into a mass entity, which needs to hold together. (White, 1999) To protect the cyclists, most CM rides have "corkers", cyclists who volunteer to stop the traffic in side roads from forcing through the mass. Corkers often have signs that are held up for drivers to see with the message "Thanks for waiting" on one side. If drivers get impatient and start honking, the sign is turned around to reveal the text on the other side that says, "Honk if you love bicycles." The result is generally that flared tempers subside.

For the cyclists who started the San Francisco rides as a way to improve the safety of their ride home from work by riding together in a group, the term "critical mass" seemed to capture perfectly the spirit of what these rides were evolving into, almost organically. The Chinese method of traffic management, as described, is self-regulating and as such would be considered regressive by North American traffic engineers who place great faith in the imposed "order" of traffic lights and stop signs. Yet North American intersections with their promise of safety are also the site where most collisions occur and can be particularly treacherous for vulnerable road users. In cities like Amsterdam the number of signalised intersections of the sort that are common in North American cities have been reduced and replaced with roundabouts which "resulted in a 30 per cent decrease in injured cyclists, a 50 per cent reduction in the number of accidents, and in a more than 75 per cent reduction in the number of road accident fatalities." (OECD, 1998: 79-80). Without travelling to Amsterdam, Critical Mass provides a liberating experience for North American cyclists to ride en masse in a crowd of bicycles numerous enough to temporarily disrupt the norm and to assert a right of way hierarchy that puts vulnerable road users before motorized road users. In this fleeting monthly experiment cyclists travel in safety and without fear of intimidation.

According to the founders of the ride, it is important to the success of CM that no one is in charge, that it be a xerocracy. An informal definition of xerocracy is rule by xerox, ie. that anyone who cares enough about something to produce a photocopied document will have his or her viewpoint heard. "Xerocracy promotes freedom and undercuts hierarchy because the mission is not set by a few in charge, but is broadly defined by its participants. The ride is not narrowly seen as an attempt to lobby for more bike lanes (although that goal exists) or to protest this or that aspect of the social order (although such sentiments are often expressed). Instead, each person is free to invent his or her own reasons for participating and is also free to share those ideas with others." (Carlsson, 1993: 4) This philosophy is a powerful one but as co-founder Beth Verdekal discusses, it takes most people some time to understand how to operate in a non-hierarchical manner: to work "by cooperative methods rather than the authoritarian way. It's so different from the way anything else is run that I think it's at once befuddling but in another way it's really liberating." (White, 1999)

Interestingly, the loose nature of CM with no proscribed political agenda, no commercial interest and no organizing body or target group attracts people who would not otherwise be part of a cycling group. A young black male San Francisco participant describes the structure as "inclusive, that there is no requirement other than you bring a bike which is probably one of the most simplest things around." (White, 1999). There is quite possibly no other cycling event in the U.S. or Canada in which people of colour feel this comfortable. Women, likewise, who are typically in the cycling minority

are usually well represented at Critical Mass. One young white San Francisco woman describes why. "I find it very empowering because you're sort of taking back territory and you're reclaiming part of public property that usually isn't yours because bikes are so forgotten when it comes to the street. It's like a 'take back the night' march for me. You're reclaiming this territory that singly, by yourself alone, which is usually the way that I ride--by myself--that's not my space. I feel afraid, I get harassed, I am not welcome there and that's what ... Critical Mass represent[s] for me." (White, 1999).

That women and people of colour feel comfortable on the rides may well be due to the fact that the founders of Critical Mass worked hard to reduce the impact on the ride of what they called the "testosterone brigade". They found that instead of trying to make a political point through angry protest that it was much more important to create a spirit of celebration. In this way the ride creates "an unexpected and unpredictable space with unpredictable consequences and unpredictable reactions--both for people in it and people outside of it. ... Basically we came up with a lot of techniques and they mostly worked pretty well. We had to deal with a lot of internal issues inside the ride too like the kind of people who are attracted to coming-- you certainly get a lot of young, angry men right away, people who were spoiling for a fight... [T]here was a certain kind of antagonistic energy that they would bring to bear on the situation and that was part of the reason we really were focused on promoting it as a celebration and not as a protest and so the people who brought their angry protest and energy there were encouraged to take it elsewhere or to just get into a different spirit." (White, 1999)

As documented in Chapter 1, Forester, and the Effective Cycling program, do not advocate actively promoting people to cycle. Forester believes that most people do not possess, nor could easily acquire, the skills necessary to cycle properly in traffic. Furthermore he contends that a proliferation of novice cyclists on the roads would lead to more collisions involving cyclists. As evidence to the contrary has been demonstrated by several research studies (i.e. that as numbers of cyclists' increase, collisions decrease), there is likely something beyond the chance of an increase in collisions that concerns Forester. It could be related to the fact that the vast majority of people who choose cycling as a practical form of transportation do not enroll in an *Effective Cycling* course, or any training course at all. Cycling education is voluntary in North America and only offered outside the school system. This is unlike the European cycling-friendly countries in which cycling education is mandated within elementary schools. So, any increase in North American cycling means a proliferation of "unprofessional" cyclists on the roads, thus interfering with the image that vehicular cyclists are striving to portray.

Critical Mass on the other hand, not only acts to encourage people to cycle, but to enter into a radically different, less consumer-oriented, more community-focused lifestyle. Chris Carlsson describes with pride and excitement the great influx of bikes on San Francisco streets since the first Critical Mass rides took hold in 1992. "I know dozens and dozens of people who I've met personally who said 'you know thanks to Critical Mass I started riding and this is great. I'm saving tons of money. I'm having a great time. I met new people. I have a whole different life.' It's changed people's lives in a really tangible way--in a very concrete sense on a day-to-day level. I think that's fantastic. That's as

much as we could hope for today. Tomorrow we could hope for more but today that's as good as it gets and that's pretty good." (White, 1999)

Critical Mass has arguably been as successful and popular as it has because it is an inclusive, non-hierarchical, transformative grassroots movement. Not surprisingly it comes under attack from proponents of vehicular cycling. The Ontario Coalition for Better Cycling (OCBC), for example, has John Forester's widely-used quotation ("Cyclists fare best when they act and are treated as drivers of vehicles") featured prominently underneath the OCBC logo on their web site. The site tracks the progress, on a monthly basis, of individual cases whereby cyclists' rights, according to OCBC, have either been upheld or disregarded. In the September 1999 entry, the webmaster describes with a certain amount of satisfaction the arrests and ticketing that took place during a Critical Mass ride in Toronto. "The irresponsible behaviour characterizing critical mass in Toronto has little or nothing to do with improving the environment for cycling and more to do with political ends of anarchists in the cycling community there. ... The effect of [these] activities is the generation of hostility towards cyclists, not respect. Equal rights on the road also means equal punishment for unlawful behaviour. Crackdowns on driver and cyclist behaviour which threatens the safety of others would be good news for responsible cyclists." (The Ontario Coalition for Better Cycling, 2001: On-line)

Although it is not only vehicular cyclists who shy away from the sometimes confrontational and law-bending behaviour that characterizes many Critical Mass rides, the vehicular cyclists tend to be the most vocal group in their opposition to these popular displays of cycling solidarity. Critical Mass is best when it is on the offensive. When it comes time to defend itself it becomes extremely problematic, especially due to the fact that it has no identified leaders. What is even more difficult, however, is that the ordered, reasoned approach of the vehicular cyclists tends to be more understandable and respected by established institutions with which they interact. Critical Mass is a counter-culture movement more easily dismissed by the status quo. Vehicular cyclists, on the other hand, generally "fit in" in every way except for their transportation choice. They tend to be comfortable with and speak the language of the dominant group and use this to their advantage. Despite the dubious evidence backing up their beliefs, vehicular cyclists frequently refer to science almost as a code word to prove their respectability. Avery Burdett, OCBC chairman (sic), for example, makes unsubstantiated claims to back up his dislike of bicycle lanes and then proceeds to critique cycling activists for being unscientific. "The axiom in the cycling world that cyclists fare best when they act and are treated as operators of vehicles is well-founded. Research shows that vehicular cycling reduces the chance of accident by 80%. Segregated bike lanes and bike paths convey the false notion that vehicular cycling among other traffic is unsafe. ... The results are disturbing: cycling advocates whose demands have no basis in science or engineering; a proliferation of dangerous cycling facilities;..." (The Ontario Coalition for Better Cycling, 2001: On-line)

#### Cycling Safety Discourse & Individual Rights

A close examination of the discourse around safety, and bicycle safety in particular, reveals that behind the use of the word "safety" are writers who very often have clearly defined politics and

operational biases which seem to have less to do with safety than with individual rights. This is especially clear in the way in which the word "safety" and "danger" is used by vehicular cyclists. Burdett's criticism is not reserved only for North American cycling advocates. According to Burdett, the Netherlands' Board of Tourism, via their web site, "tries to promote their country as a cyclist's paradise and inadvertently shows how cyclists are relegated to second class road users and how their safety is compromised for the convenience of motorists." (Burdett, A., 2001: On-line) What can be found by looking at the source is that Burdett is referring to the descriptions of instances where cyclists must give way to other road users in the Netherlands and that it is the obligation of cyclists to use separate lanes if they are available. (Netherlands Board of Tourism, 2001: On-line) Given the dramatically lower fatality rates for the Netherlands, especially as compared to the U.S. where bicyclist fatalities are roughly four times higher (Pucher & Dijkstra, 2000:14), it seems less than fair to charge the Dutch with compromising the safety of cyclists. However, although Burdett conflates safety and individual rights, he does reveal that even though the Dutch provide a safer environment for cyclists they have not gone far enough in shifting the norm away from the motor vehicle. It is possible to provide special facilities that do not marginalize cyclists for the convenience of motorists. Unfortunately vehicular cyclists tend to be reluctant to work toward such a differentiation and typically steer clear of any special treatment for cyclists altogether.

The implicit message behind much of the arguments that the vehicular cyclists put forward is that they have in fact learned strategies to cope with the traffic environment as it exists, strategies which seem completely normal and comfortable to them. They have not only mastered the art of cycling in heavy traffic, but find it stimulating, similar to an athletic challenge, and are thus resistant to a softening of the experience which has become part of their daily routine. Although many more potential cyclists could be persuaded, and would be equal to, picking up the necessary skills, as with any athletic challenge, it is inequitable that this healthy mode of transportation should be reserved only for those who are "trained, fit, and daring enough to navigate busy traffic on city streets." (Pucher, Komanoff & Schimek 1999:24) Regardless of whether or not potential cyclists *could* learn vehicular cycling skills, the traffic environment which is seen as challenging and fun to many vehicular cyclist proponents produces anxiety and tension in ordinary cyclists.

### The Opportunity Behind the Conflict between Operating Beliefs of Critical Massers & Vehicular Cyclists

What we have here is an extremely polarized situation, which all cyclists, myself included, are affected by and participate in to varying degrees. Critical Mass attracts cyclists who are interested in social change and are willing to challenge existing legal and social norms to achieve this change. Proponents of vehicular cycling tend to be, in every other way except for cycling, situated comfortably within the social structures that exist, so minor modifications only are deemed necessary to accommodate cycling. On the one hand the cycling education aspect of the polar positions seems quite insignificant, especially as most cyclists have not participated in any formal training and are barely aware of the ideological differences embedded within it. However, those who have been trained in the *Effective Cycling* program tend to be very aware of, and set themselves apart from, the

"uneducated" cycling masses. They are closely aligned with power, both literally in terms of access through committees, etc. and in terms of their social position (e.g. white males.) Thus the viewpoints of this group have much better representation than is typical for minority opinions. Two questions arise. Is it necessary, and if so is it possible, to reduce the scope of this conflict?

In some places, such as San Francisco, the position of the vehicular cyclist is not as strong as in other cities and thus there is not as much effort expended on conflict management. Where the vehicular cyclists have more power, such as in Toronto, the conflict with cycling activists striving for social change is often high. Both groups of cyclists would agree that the conflict is usually unproductive and primarily serves to diffuse energy from the joint task of improving the safety of cyclists. But conflict resolution has never been achieved. As with other polarized situations, it is all about power and who has it and groups outside often attempt to unseat the group in power. There are good reasons to diminish the power that vehicular cycling proponents have within city hall, the strongest being that a publicly funded transportation program should have within its mandate the goal of providing for many and the most vulnerable. For example, the Toronto Transit Commission is on its way to ensuring that public transit is accessible to the disabled. Vehicular cycling necessitates a level of strength and courage in those it serves not fitting for a public institution and it is the only transportation mode in which such requirements are placed upon its users. Also, although there is quite a bit of compelling evidence to suggest that experienced cyclists are less likely to be involved in a collision or crash, only a fraction of experienced cyclists have received *Effective Cycling* training. This fact provides evidence of the existence of other worthwhile methods of gaining experience. However, although it is possible to build a persuasive case for why vehicular cyclists should not remain the only or defining voice of cyclists in policy discourse, there may be ways to reach some kind of compromise resulting in a more long-standing advance.

This is where a focus on the pedagogical method employed could be useful. During the time frame of the writing of this thesis the City of Toronto has discontinued the use of John Forester's book as a requirement for those who enroll in CAN-BIKE. The City has produced their own manual that steers clear of some of the more controversial aspects of Forester's theory while retaining others. Essentially this process has attempted to make the educational material as neutral as possible and is successful in making the ideological framework more obscure. This is a good step and may be as far as the limited funding at the City allows this to go. However, it is unlikely that it will lead to an increase in the numbers of people who enroll in the course and it does not change the transmission model of teaching employed.

A bolder step would be for city employees in charge of cycling education to take a good look at how to connect with the grassroots Critical Mass movement. The way in which Critical Mass is marginalized by politicians and city staff on the one hand and subjected to heavy-handed police tactics on the other only serves to entrench and widen the gap between the two perspectives. Many of the illegal actions that Critical Massers engage in during the rides have been legalized in countries where cycling is fostered and a social responsibility model of cycling safety exists. These were itemized in Chapter 1 but include exempting cyclists from coming to a full stop at stop signs, reducing fines for traffic offenses, giving cyclists priority over motor vehicles at intersections and allowing

cyclists to travel both directions on one-way streets. Furthermore the community spirit that CM rides foster, and the actions that cyclists take on these rides to look after each other (eg corking), are important characteristics to foster if a move toward a more social responsibility model of cycling safety is to take place. What is perceived in North America to be irresponsible behaviour of anarchic cyclists is on the other side of the globe considered to be the practical accommodation of a unique mode of transportation which must be encouraged if cities are to remain viable. The current climate of intolerance toward those striving for social change results in a very narrowed range of acceptable ideas and conduct and increases the proportion whose viewpoints are outside that norm. Although such structural change is not typically within the cycling training mandate, there are ways in which the pedagogical approach could be improved so that it is more inclusive, expands the knowledge base of the participants, is consistent with and encourages social change.

Drawing on the five pedagogical alternatives described earlier, cycling educators could explore options for shifting from the transmission, expert-based pedagogy employed by the *Effective Cycling* program. Employing a constructivist approach in which knowledge is produced by the community involved, not by experts, could involve such activities as City cycling staff sitting down with a group of vehicular and "ordinary" cyclists to go through the *Effective Cycling* educational material in an attempt to separate the skills that both could agree are neutral, technical skills from those that are more ideologically based. In the first category there could be skills such as learning how to balance, how to change a tire, etc. In the second would likely be skills such as learning how to overcome an "irrational" fear of cars and how to "take the lane" so that cars do not pass too closely. Once the two lists have been compiled, agreement would need to be reached about what to do with the tips and skills that are ideologically based. In a knowledge-building environment these would not be discarded but put forward as one theory among many and participants would be encouraged to dispute it or build upon it. A set of basic principles *would* need to be agreed to, perhaps the most significant principle being that a norm shift away from the automobile is needed so that any provisions made for cyclists must not marginalize them. However, the theories of all participants must be treated with respect and ideas should be considered improveable instead of right or wrong. In this way cyclists and potential cyclists can make progress from whatever their starting position is. More importantly the theories of one group do not dominate another and proponents of any theory need to provide some context for their theory. Rather than avoiding discussion about conflicting theories, group members work together to draw important elements from each thus students would feel engaged in the learning process rather than just passive recipients of information.

Another important component of the educational program which is sorely lacking presently are transformative learning strategies that encourage learners to situate this skills-based training activity within the world and to strive to reduce the inequity of the current situation in which vulnerable road users are not properly protected or planned for. The viewpoint of the novice is especially important because it is at this stage that their naive ideas can either be trampled upon or brought out into the open and examined alongside of others ideas. For example, inexperienced cyclists typically "hug" the curb when they are riding—moving in and out between parked cars. Experienced cyclists generally ride in a straight line, which makes them more predictable to other traffic and also

decreases the number of times that they need to merge. In a knowledge-building environment, instead of merely trying to eradicate the riding patterns of the novice cyclist, they would be encouraged to explore their feelings of fear of riding beside motor vehicles. In an environment that saw differing perspectives as useful rather than something to suppress, participants could become motivated to turn their fears into action, such as advocating for separation of bikes from cars. Cyclists new to riding in traffic are in a better position to do so because most experienced cyclists, whether vehicular or not, have, in varying degrees, overcome their feelings of fear of motor vehicle traffic and thus are less passionate about the need for the type of facilities that novice cyclists especially enjoy.

A sense of urgency to change the traffic environment is by no means the only contribution that novice cyclists can make. Cyclists can and do learn from each other, no matter how experienced they are. New cyclists have sometimes learned techniques that are helpful even to the most experienced cyclists. For example, two "untrained" cyclists who have less experience cycling than I have taught me a very pleasant alternate route which completely avoids a busy street I normally took. In a knowledge-building, transformative learning environment all learners have something to offer one another. Thus, this knowledge-building approach could afford some strategies that, if enacted, could help to find common ground between the individualistic and transformative approaches to cycling that currently have no real point of contact or meaningful discourse.

### Conclusion

This chapter has explored how cycling education might operate if it were situated within a social responsibility model employing pedagogical alternatives to the transmission model of teaching. Both this chapter and the preceding one were primarily theory-based. The upcoming chapters will describe an empirical project which tested the beliefs, concerns and attitudes of individuals toward the Individual and Social Responsibility models of cycling safety. In keeping with a knowledge-building approach, opinions were solicited not just from those who have considered these issues at length but also from those who have not.

## **Chapter 3**

### **Methodology**

My intent in this research was to study the societal structures in place in Toronto which have created an environment that is less than ideal for cycling. The most expedient way to do this was to ask individuals, who either cycle presently or are likely to cycle, about the barriers they encounter and the attitudes they hold. The difficulty with this approach is that it neglects the operational frameworks and biases of bureaucrats and the policies enacted by politicians. As such this method does not analyze the system directly. Rather, it informs us of the perceptions of those who interact with the transportation environment in Toronto. Insights into the planners' and politicians' intentions that resulted in Toronto's cycling environment remain an outstanding issue for further research.

As a random sample is both costly and time-consuming, a convenience sample was used instead for this study. The method used was a nonprobability sampling technique, ie. the administration of a cycling attitudinal survey. The primary sampling was conducted at two university campuses and was considered appropriate to the subject matter at hand for a couple of reasons: 1) The primary subjects were university students as there is a high likelihood that this group participates in cycling due to their age, proximity to school, and income level, 2) This study was not trying to generalize the characteristics of a larger population from the sample. Rather it was an explanatory study examining relationships among variables and trying to understand the conditions under which there is, or is not, a relation between the major variables under investigation. The drawbacks to using this survey approach are that 1) it is more difficult to ensure that bias is minimized in the sample selection, and 2) the more powerful parametric tests of significance which rely on a random sample may not be used.

#### **Design**

A survey was designed to test attitudes toward improving social conditions for cyclists and to determine the characteristics of those who would like to cycle more than they currently do. This survey was pilot tested twice to determine whether the length was appropriate and whether there was any confusion in the wording of questions. After each pilot test, some questions were dropped and the wording of some questions was revised.

#### **Confidentiality Considerations**

To assure anonymity, the respondents were instructed not to put their names on their completed surveys and the universities are identified in this and any other future reporting only as "two downtown Toronto universities."

#### **Subjects & Data Collection Procedure**

A total of 188 people completed the survey that can be found in Appendix B. Eight surveys were spoiled so were not included in analyses. The sample size was further reduced for some of the

questions due to changes made following pilot testing. The original plan for data collection was to conduct all of the surveys in classes at a downtown university. Due to time restrictions and difficulties in obtaining permission from instructors, only the pilot tests were conducted in this manner and the rest of the surveys were administered to the different groups as described below.

There were five groupings of people who participated in this study:

**Group 1:** These respondents were 21 students from a downtown university in an advanced sociology course. The course instructor administered the survey to the students on May 29/00.

**Group 2:** These respondents were 14 students from a downtown university in an introductory sociology course. The course instructor administered the survey to the students on June 13/00.

**Group 3:** These respondents were 16 City of Toronto staff and volunteer members of the Toronto Cycling Committee, "a special committee of City Council whose mandate is to initiate programs to increase the quantity and quality of bicycle trips in the City of Toronto." (City of Toronto Cycling, 2000) I was making a presentation about cycling conditions in Europe at a meeting of the committee on July 17/00. At the end of this presentation I requested those present to complete the questionnaire. Most did and returned the surveys after the meeting ended.

**Group 4:** These respondents were 12 volunteer members of Advocacy for Respect for Cyclists (ARC), a cycling lobby group operating independently of City Hall on issues of legal defense, direct action and education on cyclists' rights. I am a member of the group and attended a monthly ARC meeting on July 20/00. After the meeting ended, a request was made to those present to spend a few minutes completing the questionnaire.

**Group 5:** These respondents were 125 members of the public accessing libraries at two downtown universities. With the help of three assistants, I administered the survey on July 24/00. Those conducting the survey stood on either side of two doorways leading into the university libraries and approached people exiting or entering with the following script: "I'm conducting a survey about cycling in Toronto for a master's thesis project at OISE/UT. It takes about 2-3 minutes to complete. Would you be willing to participate?" 60 surveys were completed in approximately 2 hours outside of the first university library and another 65 surveys were completed in about 1.5 hours at the other downtown campus.

### Research Questions

**Research Problem #1:** To describe the attitudes of survey respondents at two downtown Toronto university toward two models of cycling: individual and social responsibility.

**Measurable concepts defined:** 1) Individual responsibility model: cycling is an individual choice and safety is an individual responsibility (cyclists should look after themselves).

2) Social responsibility model: cycling is determined by social and physical conditions and safety is a social responsibility (cycling should be structurally enabled as a safe mode of transportation.)

Dependent variable: supportive of social and physical conditions to improve cycling.

Independent variables: sex, visible minority status, political beliefs, environmental concern, cycling status.

Hypothesis: Men, white respondents, right-wing voters, those with lower environmental concern and non-cyclists will be more in favour of an individual responsibility model of cycling while women, visible minorities, left-wing voters, those with higher environmental concern and cyclists will be more in favour of a social responsibility model.

Hypothesis: That a specific personal improvement (helmet law) will be more opposed by those directly affected by it, i.e. by younger respondents than older.

Research Problem #2: To describe the barriers and opportunities to encourage utilitarian cycling in Toronto amongst survey respondents at two downtown Toronto universities.

Measurable concepts defined: 1) Environmental: Physical and/or social reasons typically outside the control of the individual, such as the actual distance a person must travel, traffic conditions on routes traveled (ie high speed/high volume motor vehicle traffic), proximity to bicycle facilities, public policies implemented to encourage (eg exemptions for cyclists of some traffic laws) or discourage cycling (eg helmet law) and amount of space dedicated on streets and off to bicycles. 2) Personal: individual fitness levels, general health, fashion, no access to bike/don't know how to ride, etc.

Dependent variable: environmental and personal cycling concerns, willingness to cycle.

Independent variables: sex, age, visible minority status, country of origin, attitudes toward helmet law, riding comfort level on different facilities, cycling status

Hypothesis: That men, older respondents, white respondents, Canadian-born, those in favour of mandatory helmet laws, and those comfortable riding on major roads without bicycle lanes will have fewer cycling concerns, both personal and social, and cycle currently as much as they would like to. Women, younger respondents, visible minorities, immigrants from bicycle-friendly countries, respondents opposed to mandatory helmet laws, and those not comfortable on major roads without bicycle lanes will have more concerns, both personal and social, and that there exists a latent desire to cycle or cycle more than they do presently.

Hypothesis: That two specific concerns, one personal (appearance) and the other social (traffic environment) act as greater deterrents against cycling for women than men. Hypothesis: That social concerns act as greater impediments to cycling than do personal concerns, especially for non-cyclists.

### Data Preparation

Every response within each questionnaire was given a numerical value, as indicated in the Code Book found in Appendix C. The questions were designed to inform the two primary research questions. Although in many cases a question on the survey translated into a variable of study (eg sex, political affiliation, age, visible minority status, etc.) there were others that required grouping. For

example, there were 18 items on a Likert scale which participants responded to by choosing a number between 1 and 4, with the key being as follows: Strongly Agree=1, Somewhat Agree=2, Somewhat Disagree=3, Strongly Disagree=4. The 18 items were grouped with others into six different groups. Part of the data cleaning process involved reversing most of the items in order to give each item a high score if the respondent was in agreement. Only one question was asked in such a way that it did not require reversal. Once all the items were aligned in the same direction, the Excel spreadsheet was fed into a SPSS statistical program and correlation analyses were performed to test that the relationship between selected variables was strong enough to warrant their grouping.

#### 1. Group Variable Name: Environmental Concern

Responses to two items were involved:

Air pollution ("Current levels of air pollution and smog in Toronto are harmful to humans"): correlation ( $r$ )=.6248 ( $n=178$ ,  $p<.001$ )

Environmental governmental regulation ("The amount of governmental regulation in Ontario is adequate in the area of environmental protection"):  $r=.8344$  ( $n=172$ ,  $p<.001$ )

The correlation coefficients show that the relationship between each of these items and the resulting environmental concern grouped variable was statistically significant. In fact, of all variables, there were no others more highly correlated with these two than the environmental concern variable so there is a good degree of confidence that it makes sense to group them together. However it should be noted that, although there is a significant correlation between concern about environmental governmental regulation and air pollution, when examining the two variables separately that there are other variables more strongly correlated with them than the variable with which it is grouped together. Following the strong correlation with the environmental concern variable, the other item most highly correlated with concern about air pollution is a strong belief in the need for bike lanes and the other variable most highly correlated with concern about environmental governmental regulation is cyclist type, with the respondents who cycle for transportation expressing the most concern.

#### 2. Group Variable Name: Personal Cycling Concerns

Responses to six items were involved:

Friends don't cycle ("None of my close friends and/or family members cycle"):  $r=.6218$  ( $n=157$ ,  $p<.001$ )

Don't like cycling ("I don't like cycling"):  $r=.6163$  ( $n=178$ ,  $p<.001$ )

No bike ("I don't have a bike and/or don't know how to ride"):  $r=.5775$  ( $n=172$ ,  $p<.001$ )

Passengers ("I need to carry passengers and/or heavy loads which is difficult by bicycle"):  $r=.5713$  ( $n=177$ ,  $p<.001$ )

Health problems ("Health and/or fitness reasons reduce my ability to cycle"):  $r=.5063$  ( $n=177$ ,  $p<.001$ )

Appearance ("My appearance is important and it's hard for cyclists to look nice"):  $r=.3949$  ( $n=175$ ,  $p<.001$ )

The correlation coefficients show that the relationship between each of these items and the resulting personal cycling concerns grouped variable was statistically significant which is important to verify before proceeding with analysis of this variable and, of all variables, the environmental concern variable was the one most highly correlated with each of these six variables. For the environmental concern variable itself though, although there was no other variable it was more strongly correlated to than the first four variables, there was one other variable (distance in the social cycling concerns grouping) more strongly correlated with it than health problems and appearance. This results in a slightly weaker degree of confidence that these variables are the best to group together.

Again it is interesting to note the individual variables are sometimes more strongly correlated with other variables than those with which they are grouped together. Following the strong correlation with the personal cycling concerns variable, the other item most highly correlated with friends don't cycle, don't like cycling, passengers, and appearance is, in each case, distance. This is very likely indicative of the sprawling nature of Toronto and its resulting impact on personal concerns about cycling. No bike seems to be a good variable for this group as the next variable most highly correlated with it don't like cycling, another variable in the personal cycling concerns grouping. Oddly, the next variable most highly correlated with health problems is immigrant type, with a strong relationship appearing between those respondents who were born outside of Canada and health problems reducing ability to cycle.

So this personal cycling concerns grouped variable has a lot of "noise" in it, which means either that there are other variables (the most obvious being distance) which perhaps should be included in this group or that possibly some of these variables should be dropped out. It should be noted that none of the variables have a very high  $r$  value, although the  $p$  values all do fall within the .001 significance level.

### 3. Group Variable Name: Social Cycling Concerns

Responses to three items were involved:

Weather ("The weather in Toronto makes cycling difficult"):  $r=.6840$  ( $n=177$ ,  $p<.001$ )

Distance ("I live too far from most places I need to go to ride a bike there"):  $r=.6749$  ( $n=177$ ,  $p<.001$ )

Traffic environment ("Reducing the amount and speed of motor vehicle traffic would improve cycling in Toronto"):  $r=.5509$  ( $n=174$ ,  $p<.001$ )

The correlation coefficients show that the relationship between each of these items and the resulting social cycling concerns grouped variable was statistically significant and there were no other variables more highly correlated with these three than the social cycling concerns variable so there is a good degree of confidence that it makes sense to group them together. When examining the variables separately we find that, following the strongest correlation with the social cycling concerns variable, the variable most highly correlated with weather is distance but the correlation between weather and traffic environment is not significant. The next variable most highly correlated with distance is the personal cycling concerns grouped variable. The next variable most highly correlated with traffic environment is motorist education (in the social cycling improvements grouping) which

reveals that a relationship exists between those respondents concerned about motor vehicle traffic and those in favour of mandatory training for motorists in how to drive near cyclists.

#### 4. Group Variable Name: Personal Cycling Improvements

Responses to two items were involved:

Cyclist education ("Cyclists should be required to have training in how to ride near motor vehicles"):  $r=.8331$  ( $n=179$ ,  $p<.001$ )

Helmet law ("There should be a law requiring cyclists of all ages to wear a bicycle helmet"):  $r=.9045$  ( $n=178$ ,  $p<.001$ )

The correlation coefficients show that the relationship between each of these items and the resulting personal cycling improvements grouped variable was statistically significant and there were no other variables more highly correlated with these two than the personal cycling improvements variable so there is a good degree of confidence that it makes sense to group them together. When examining the variables separately we find that, following the strongest correlation with the personal cycling improvements variable, the variable most highly correlated with cyclist education is helmet law and the reverse is also true. As these are the variables with which they are grouped together with, this increases the confidence in this grouping.

#### 5. Group Variable Name: Social Cycling Improvements

Responses to four items were involved:

Right of way ("There should be a right-of-way law in which motorized vehicles must yield to bicycles who in turn must yield to pedestrians"):  $r=.7308$  ( $n=177$ ,  $p<.001$ )

Lower fines ("Cyclists should be required to pay lower fines for traffic offenses than motorists"):  $r=.6727$  ( $n=179$ ,  $p<.001$ )

Motorist Education ("Motorists should be required to have training in how to drive near cyclists"):  $r=.6307$  ( $n=177$ ,  $p<.001$ )

Bike Lanes ("There should be more bike lanes and paths for cyclists in Toronto"):  $r=.5485$  ( $n=178$ ,  $p<.001$ )

The correlation coefficients show that the relationship between each of these items and the resulting social cycling improvements grouped variable was statistically significant and there were no other variables more highly correlated with these four than the social cycling improvements variable so there is a good degree of confidence that it makes sense to group them together. When examining the variables separately we find that, following the strongest correlation with the social cycling improvements variable, the variable most highly correlated with right of way is motorist education that is in the same grouped variable. The next variable most strongly correlated with lower fines is cyclist type, with the respondents who cycle for transportation the most in favour of this improvement which seems to indicate that this item fits with the others in this grouping for this specific group of cyclists only. The next variable most strongly correlated with motorist education and bike

lanes is right of way which is in the same grouped variable. So these correlations, with perhaps a caveat for the lower fines item increase the confidence in the grouping of these variables together.

#### 6. Variable Name: No Cycling Improvements

Responses to only one item were involved:

Status quo ("Cyclists who know how to ride in traffic and obey traffic laws are safe on any Toronto street"): The variable most highly correlated with this item is visible minority status:  $r=.1777$  ( $n=141$ ,  $p<.05$ ) which reveals that visible minority respondents were more likely to respond affirmatively to this statement. This was an unexpected result.

All of the correlation analyses on the grouped variables indicate that the items of which they are comprised do cohere to each other. There were varying confidence levels for each grouping and this should be taken into account upon further analysis. To summarize, the confidence of each grouping could be ranked as follows:

Environmental Concern: good

Personal Cycling Concerns: fair

Social Cycling Concerns: good

Personal Cycling Improvements: very good

Social Cycling Improvements: good

Some testing was conducted on varying the variables that comprised these groups. For example, Traffic Environment was removed from Social Cycling Concerns and included with Social Cycling Improvements, Distance was moved over to Personal Cycling Concerns from Social Cycling Concerns, Lower Fines was removed from Social Cycling Improvements, and so on. The resulting coherency of the new groups was not sufficient to warrant the change so the original groupings remained for further analysis.

#### Data Analysis

In order to make sense of the data, a combination of crosstabs, correlation matrices and charts were used. Both crosstabs and correlation analyses are appropriate tests for ordinal data (dependent variable) and ordinal/ratio data (independent variables). For Research Problem #1, a crosstab was first performed to establish whether or not a relationship existed between political beliefs and responsibility model type. A relationship between these two variables was determined, so a series of crosstabs were then performed controlling for other variables which could potentially impact upon the relationship, such as environmental beliefs, sex, age, and visible minority status. For Research Problem #2, a crosstab was first performed to establish whether or not a relationship existed between sex and willingness to cycle. It did and a series of crosstabs were performed controlling for other variables which could impact upon the relationship, such as helmet law, comfort level riding on streets without bicycle facilities, sex, age, and country of origin. The key findings of this data analysis are discussed in greater detail in the next two chapters.

## **Chapter 4**

### **Attitudes Toward Two Models of Cycling: Individual and Social Responsibility**

**Research Problem #1:** To describe the attitudes of survey respondents at two downtown Toronto university toward two models of cycling: individual and social responsibility.

In places where cycling is flourishing, this phenomenon is accompanied by strong public policies and cycling infrastructure improvements which place the responsibility for cycling safety more at the social level than the individual. Ontario has historically provided only weak support for cycling, especially transportational cycling. The current conservative provincial government, although essentially no better or worse than any other in terms of cycling, has potentially negatively impacted cycling in two ways: 1) the most direct way is that it passed a mandatory helmet law in 1995, such law being an important instantiation of individual responsibility as applied to cycling; and 2) its overall mandate to drastically reduce all types of social programs and policies may have indirect effects on this vulnerable transportation mode. In no way has it *positively* impacted cycling, either directly or indirectly. As argued earlier, transportation neutrality as an operating principle results in a form of inferior status for cyclists. Shifting this would involve first eliminating the inferior status of bicycles and secondly, giving bicycles *preferential* treatment. Although it is not alone in its neglect of cycling transportation, a conservative government is arguably the least likely to implement policies that would overturn transportation neutrality. To test this assertion, the existence and strength of a relationship between political beliefs and responsibility model type was explored. It was expected that there would be a relationship between those who support the social responsibility model for cycling and political beliefs and values (ie left-wing, environmental) that are currently not represented in the provincial political climate. It was also expected that those who are from marginalized groups would be more likely to support this model (ie women and people of colour.)

What became apparent during the analysis of the first pilot test data was that the two models originally conceived were insufficient. Firstly, unexpectedly, respondents varied little in support for social improvements for cycling. Support for social cycling improvements was almost universally high. Secondly, support for personal cycling improvements was also high, although generally lower than for social improvements, and there was more variation found amongst respondents in relation to this model, to be discussed in more detail below. Based on these findings it was determined that, beyond support for cycling *improvements*, an important element was missing which is essentially a satisfaction with the status quo such that *no* improvements are necessary. As cycling exists within an individualistic society, it is expected that one's comfort level within the existing transportation system would be an important distinguishing characteristic between the two models. Thus the following item was added to the survey before the second pilot test was conducted: "Cyclists who know how to ride in traffic and obey traffic laws are safe on any Toronto street." This statement was adopted from John Forester's vehicular cycling principle which is that "cyclists fare best when they act and are treated as

drivers of vehicles." (Forester, 1993: xi) This chapter examines the attitudes of respondents toward this item in addition to the two models of cycling responsibility which implicitly rely upon some improvement being necessary.

The survey administered at two university campuses confirmed the findings from the pilot studies. There was overwhelming support for social improvements for cycling with 76% of respondents being in favour. This figure increases dramatically if support for bikeways is considered alone for which 94% of respondents were in favour. On a 4 point scale, the overall mean on this measure is 3.27 (SD=.57, n=179). The social responsibility score included four elements: 1) implementing a lower traffic fine amount for cyclists, 2) a requirement for motorists to be educated about how to drive near cyclists, 3) a right-of-way law giving cyclists priority over motorists and 4) the installation of more bicycle lanes and paths.

The personal improvement score included two elements: 1) a requirement for cyclists to be educated about how to drive near motorists, and 2) a helmet law requiring all cyclists to wear helmets. Support of personal improvements for cycling was considerably less than that of social improvements with only 55% of respondents being in favour and the overall mean score indicating the response as somewhat disagreeing with this approach ( $x=2.83$ ,  $.SD=.91$ ,  $n=179$ ). This may have been due to the fact that there was considerable variability of response. For example, although 66% of respondents were supportive of the idea that cyclists should be required to have training in how to ride near motor vehicles only 21% had considered personally taking a cycling training course and a mere 8% had actually completed such a course. The majority (71%) of respondents had never even thought of taking a cycling training course.

Support for each responsibility model type was examined by how it plays out with four independent variables: sex, visible minority status, political beliefs and environmental concern. These will be described in more detail below.

## 1. Sex Differences in Attitudes toward Responsibility for Cycling Safety

### **Background**

The majority of transportational adult cyclists in North America are male. This varies by location but according to the Federal Highway Administration (1993), poll after poll finds that men cycle more for transportation than women, especially for commuting to work or school. In some cities, such as Seattle, men make up barely more than half (52%) of the commuter cyclist population whereas in other cities the difference is more significant (eg in Portland 76% of cyclists are male). According to a recent study conducted by Decima Research (2000), Toronto is somewhere in between where 61% of utilitarian cyclists are male. Neither the FHA nor Decima provided an explanation to account for these findings. The FHA acknowledges that they are puzzled. "The cause of this disparity is unknown, leaving room for speculation." (Federal Highway Administration: 1993: 14) Interestingly, the FHA declines to speculate themselves. This is quite typical. Many studies report sex differences without any exploration, let alone attempts to produce data, into why sex differences in cycling exist. Despite the dearth of data, some authors do spend some effort in putting forward possible explanations about what is causing fewer women to cycle in North America.

Aultman-Hall et al (1998, 1999) attached thousands of questionnaires to parked bicycles in Ottawa and Toronto to survey cyclists about bicycle accidents. In both cases the rate of response was much higher for men than for women (26% of responses were from women in Ottawa and 40% in Toronto). The fewer women in the sample is attributed to fewer women cyclists "due both to the attire worn at work and also to the choice of some workplace locations such as computer electronic research and development companies where typically more men are employed." (Aultman-Hall & Hall, 1998: 35) In North American cities, where urban cyclists often commute to work in full spandex gear at sweat-inducing speeds, in contrast to the everyday attire and more relaxed speed of cyclists in Europe, Aultman-Hall & Hall are not the first to suggest that concern about appearance is a possible factor in deterring North American women from cycling.

Aultman-Hall & Kaltenecker also found that the women who responded to their survey travelled shorter distances by bike than men which they surmize was not significant: "It is simply a characteristic of the sample; some groups travel more than others." (Aultman-Hall & Kaltenecker, 1999: 680). Such a ready dismissal is not warranted however because, in fact, it is not an unusual finding. Most cycling surveys that look at distance by sex find that men travel farther than women. In Australia, Parker reports that in 1985, "there were 3.5 male cyclists km ridden for every female cyclist km ridden by bicycle... More recent data for the trip to work and school confirms that this ratio has not changed for the better which indicates a serious deficiency in the road safety support system and an underlying male sexist approach in road safety planning and provision." (Parker, 2000: 6) In the UK, "National Travel Survey figures from 1975-76 and 1989-91 found that men were, by distance, cycling slightly more (5 per cent) whereas adult females substantially less (22 per cent)." (Mathew, 1997: 324) The author attributes the substantial decrease in women cycling to the increase in traffic levels "since it is they that appear to be particularly deterred by adverse traffic conditions." (Mathew, 1997: 324) Parker also refers to research which found that women cyclists were "more traffic sensitive than men." (Parker, 2000:6)

In European "bicycle-friendly" countries, not only do women cycle as much as men, but in some cases they cycle more. The sheer number of cyclists on the streets alone is a huge difference between cities like Amsterdam, where 28% of all trips are made by bicycle (Welleman, 1999: 101), and Toronto which weighs in at only 1.5% (Tomlinson, 2001: 19) Thus cycling in the Netherlands is a much more typical experience and this is reflected in the fact that there "is no difference in the frequency of bicycle use between boys and girls younger than twenty years of age, though differences do arise from age twenty onwards. Adult women undertake more trips and cycle considerably more often on average than do men in the same age category." (Welleman, 1999: 86) A similar situation exists in Germany where Lehner-Lierz & Schrodli (1992) report that women doubled or even tripled their bicycle use between 1976 and 1989. "In 1976, women and men cycled nearly the same number of trips per year; in 1982, women already cycled more than men. In 1989 a difference of about 16% in trips per year between women and men was registered. From 1976 to 1989, the increase in women's bicycle trips was about 65%, the increase in men's bicycle trips only about 36%" (Lehner-Lierz & Schrodli, 1992: 77) A 1992 survey of 12,000 Germans found that women use bicycles about 16% more often than men. Despite the fact that German women cycle more than

men do the survey found that women felt more unsafe on a bicycle and they also were more affected by the speed of cars than men.

To summarize, sex differences amongst North American cyclists have been documented repeatedly. Some attempts have been made to understand these differences but for the most part such attempts have been of a speculative nature only. The theories are not abundant. Only two have been clearly articulated: 1) women are more affected by the speed and volume of motor vehicle traffic than men and are thus more likely to cycle only if separated bicycle facilities are available, and 2) women's appearance is more important to them and so they are less likely to cycle in sweat-inducing conditions (ie those which impel cyclists to cycle fast and/or long distances.) Is there any truth to these theories? This questionnaire made an attempt to find out, both in terms of women's willingness to cycle which will be explored in the next chapter, and their attitudes toward models of responsibility for cycling safety which is the focus of this chapter.

#### Attitudes Toward Social Responsibility

There was very little difference between the sexes in terms of support for social improvements for cycling. A simple correlation matrix finds there is no distinguishable relationship between the sexes in terms of social responsibility model type. The mean for men is 3.32 (SD=.61, n=88) and for women is 3.22 (SD=.52, n=90). This is a surprising result. If women are more affected by motor vehicle traffic than men, would it not follow that their score on this measure would be higher? Or rather, since scores for both sexes on this measure are high, if men are less concerned with motor vehicle traffic why do they agree so strongly that social improvements for cyclists are necessary? As the grouping of the elements in this measure is somewhat unorthodox, analysis was also conducted on the components separately. Table 1 shows women were slightly more in favour than men that more bike lanes and paths are needed in Toronto and that motorists should have more training about driving near cyclists. Men were slightly more in favour than women that cyclists should have right of way over motorists. The most marked difference is in response to the item about lower fines for cyclists. Men were much more likely to be in favour of such a change.

Table 1

Support for Social Cycling Improvements by Sex (1=strongly disagree, 4=strongly agree)

Improvement Type	Male <i>n</i>	Mean	Female <i>n</i>	Mean	Total <i>n</i>	Mean
<i>Bike Lanes</i>	88	3.69	89	3.78	177	3.73
<i>Lower fines</i>	88	3.03	90	2.54	178	2.79
<i>Motorist Education</i>	86	3.38	90	3.46	176	3.42
<i>Right of way</i>	88	3.15	88	3.10	176	3.13
Total	88	3.32	90	3.22	178	3.27

Most research has found that there is a marked difference between cyclists and non-cyclists in terms of their attitudes toward cycling improvements so this factor was analyzed also. Interestingly,

Table 2 shows that the differences between the groups are minimal with the exception of responses to two of the statements. The score for male non-cyclists on the "right of way" item was somewhat lower than for male cyclists and lower than the average score for females, whether cyclists or not. The other item in which there is one group that seems quite different than the rest is the lower fines for cyclists item. In this case it is female non-cyclists who are much less likely to be in agreement than the other three groups. In an upcoming section on political beliefs, sex differences and attitudes toward cycling improvements will be explored further. Overall, however, support for social improvements for cyclists is almost uniformly high. The next chapter will examine whether women have more concerns about cycling than men but even if they do, this research has shown that attitudes toward social improvements are consistently high regardless of sex. Let's move on to attitudes toward personal responsibility.

Table 2

Support for Social Cycling Improvements by Sex & Cycling Status (1=strongly disagree, 4=strongly agree)

Non-Cyclists

Improvement Type	Male <i>n</i>	Mean	Female <i>n</i>	Mean	Total <i>n</i>	Mean
<i>Bike Lanes</i>	14	3.64	30	3.57	44	3.59
<i>Lower fines</i>	14	3.00	30	2.03	44	2.34
<i>Motorist Education</i>	14	3.21	30	3.37	44	3.32
<i>Right of way</i>	14	2.64	30	3.07	44	2.93
Total	14	3.13	30	3.01	44	3.05

Cyclists

Improvement Type	Male <i>n</i>	Mean	Female <i>n</i>	Mean	Total <i>n</i>	Mean
<i>Bike Lanes</i>	74	3.70	59	3.88	133	3.78
<i>Lower fines</i>	74	3.04	60	2.80	134	2.93
<i>Motorist Education</i>	72	3.42	60	3.50	132	3.45
<i>Right of way</i>	74	3.24	58	3.12	132	3.19
Total	74	3.35	60	3.32	134	3.34

Attitudes Toward Personal Responsibility

Differences between women and men's attitudes toward the personal responsibility cycling model were more marked than they were for social responsibility. The correlation coefficient for personal responsibility type and sex is significant ( $r=.2191$ ,  $n=178$ ,  $p<.01$ ). As the numerical value attributed to men was 0 and to women was 1, a positive correlation on sex reveals that women

scored higher than men did on the personal improvement measure. The mean for men is 2.63 (SD=.91, n=88) and for women is 3.02 (SD=.90, n=87) which indicates that women somewhat agreed with these measures whereas men slightly disagreed. This was an unexpected result if this model is properly capturing an individualistic approach. If so, and given that it is men more than women who possibly benefit from this approach, why would they score lower on this measure than women? Again it is important to look at the components of this measure separately to ensure that any differences are not obscured. Table 3 shows that women showed very little variation in their response to both measures--they were slightly more in favour of both helmet legislation and cyclist education than men.

Table 3

Support for Personal Cycling Improvements by Sex (1=strongly disagree, 4=strongly agree)

Improvement Type	Male <i>n</i>	Mean	Female <i>n</i>	Mean	Total <i>n</i>	Mean
<i>Cyclist education</i>	88	2.66	90	3.02	178	2.84
<i>Helmet law</i>	87	2.60	90	3.02	177	2.81
Total	88	2.63	90	3.02	178	2.83

Table 4 shows the differences between male and female cyclists and non-cyclists. Although the sex differences remain there is clearly a cyclist/non-cyclist split on this measure which is a better predictor of response than one's sex. This is an expected result given that, as most people have not given much consideration to the politics involved, helmets and cycling education are seen as motherhood issues not differentiated from what are arguably more important systemic infrastructural changes such as bike lanes. However if one is a cyclist, one learns quickly that when the onus for safety rests completely with the individual, the most significant factor creating unsafe conditions for cyclists--the volume and speed of motor vehicles in close proximity to cyclists--has been left unaddressed. That men feel this more strongly than women, even those that are cyclists, is somewhat puzzling. It may well have more to do with perceived risk and concern about safety than it does with the actual solution being proposed. Noland (1992) surveyed cyclists in Philadelphia and found that those wearing helmets and female cyclists overall had a higher perception of the risk of bicycling. "This indicates that those taking protective measures to reduce their risk have higher levels of perceived risk." (Noland, 1992: 347) Whether or not such an explanation holds true for Toronto cyclists will be pursued in the next chapter. What these data show at this point is that non-cyclists are in agreement with personal cycling improvements whereas cyclists slightly disagree. For both cyclists and non-cyclists, females are more in favour. Overall, these scores are lower than those for the social improvements measure.

Table 4

**Support for Personal Cycling Improvements by Sex & Cycling Status (1=strongly disagree, 4=strongly agree)**

**Non-Cyclists**

Improvement Type	Male <i>n</i>	Mean	Female <i>n</i>	Mean	Total <i>n</i>	Mean
<i>Cyclist education</i>	14	2.89	30	3.43	44	3.26
<i>Helmet law</i>	14	3.21	30	3.53	44	3.43
<b>Total</b>	<b>14</b>	<b>3.05</b>	<b>30</b>	<b>3.48</b>	<b>44</b>	<b>3.35</b>

**Cyclists**

Improvement Type	Male <i>n</i>	Mean	Female <i>n</i>	Mean	Total <i>n</i>	Mean
<i>Cyclist education</i>	74	2.61	60	2.82	134	2.71
<i>Helmet law</i>	73	2.48	60	2.77	133	2.61
<b>Total</b>	<b>74</b>	<b>2.54</b>	<b>60</b>	<b>2.79</b>	<b>134</b>	<b>2.65</b>

#### **Attitudes Toward No Improvement**

The response to the statement "Cyclists who know how to ride in traffic and obey traffic laws are safe on any Toronto street" revealed sex differences that were different from those found in either the response to the social model of responsibility (virtually no sex differences) or to the personal model (in which sex differences are narrowed significantly if one separates cyclists from non-cyclists). Table 5 shows that men, regardless of whether or not they were cyclists, responded with stronger agreement to this statement than women did. Men's response to this statement was very stable whereas women's was more variable depending on whether or not they were cyclists. However for both sexes, respondents disagreed somewhat with this statement and a simple correlation matrix found the relationship was not significant. The mean for all men is 2.36 (SD=1.14, n=81) and for women is 2.05 (SD=1.00, n=62). For cyclists the mean for men was the same at 2.36 (SD=1.15, n=72) whereas for women was somewhat lower at 2.00 (SD=1.02, n=45). For non-cyclists the mean for men is slightly lower at 2.33 (SD=1.12, n=9) and for women is somewhat higher at 2.18 (SD=.95, n=17). The sex differences in response to this statement, then, are most marked between cyclists. Male cyclists are most in agreement and female cyclists the least. So despite the fact that women, more than men, believe that cycling education and helmet legislation are necessary, their response to this statement reveals that, regardless of cycling status, they are less likely than men to believe that such measures are sufficient to ensure the safety of cyclists.

Table 5

**Support for No Cycling Improvement by Sex & Cycling Status (1=strongly disagree, 4=strongly agree)**

Cycling Status	Male <i>n</i>	Mean	Female <i>n</i>	Mean	Total <i>n</i>	Mean
<i>Non-Cyclists</i>	9	2.33	17	2.18	26	2.23
<i>Cyclists</i>	72	2.36	45	2.00	117	2.22
Total	81	2.36	62	2.05	143	2.22

**2. Visibility Minority and Attitudes toward Responsibility for Cycling Safety****Background**

Sex differences are largely not reported in the cycling literature but even less has been written about visible minorities and their relationship to cycling. Epperson (1994) is one exception who distinguishes between voluntary (those who choose to cycle but have transportation choice and typically prefer to "travel on unaltered road facilities as part of the traffic flow" [Epperson, 1994: 6]) and involuntary cyclists (those who *have* to cycle having no other option available to them and typically prefer bike lanes and paths.) North American voluntary cyclists are described as "primarily white, upper middle-class or wealthy suburban professionals" (Epperson, 1994: 6) which leads one to infer that involuntary cyclists must be more likely to be people of colour, poor and living in an American city. As racial separation is fairly entrenched within the U.S. where the poor and people of colour are concentrated in urban centres such an inference makes sense. Extending it to involuntary cyclists living in Canadian cities such as Toronto is less warranted as the downtown core "actually has a slightly lower immigrant and visible minority population than its suburbs." (Smith Lea, 2000: 55)

Despite the fact that the bicycle is an inexpensive form of transportation, even involuntary cycling by the poor seems to be low. "Conspicuously absent from the American cycling world are those whom conventional wisdom would consider most likely to cycle: the poor and other persons of low status." (Forester, 1994: 21) According to Forester, because of the bicycle's low social status, cyclists need to be able to withstand social pressures and to be the type of person "whose prestige and job prospects will not be lowered by their cycling." Forester believes this accounts for why so many vehicular cyclists are technical professionals. "These people tend to think for themselves but to largely agree with social norms about matters other than cycling -- characteristics that reflect the self-reliant, scientifically based, cooperatively self-interested nature of vehicular cycling." (Forester, 1994: 20) Although Forester avoids describing the race and sex of this group, white-collar professions continue to be populated by white men, despite efforts to close the gender and race gap in the workplace. Several studies (eg Moritz, 1998, Decima, 2000) confirm that North American cyclists tend to be well-educated professionals with higher than average household incomes. However, with the exception of Epperson, authors typically steer clear of the issue of race.

A notable exception to this is Smith's (1972) historical account of cycling in the U.S. He describes how in 1890 the "color line was first drawn when it came to membership in the League of American Wheelmen (LAW) and participation in league-sponsored racing meets." (Smith, 1972: 162) Although it took longer for blacks to take up cycling due to the expense, when they did they naturally

wanted to be included in races. The LAW first tried to avoid dealing directly with the issue but finally in 1893, led by white members from the South, the "constitution was amended, and Negroes were excluded from membership in the League of American Wheelmen." (Smith, 1972: 163) Making such discrimination explicit set LAW apart from other cycling groups at the time, most of which did not follow LAW's lead. LAW is the same organization which only recently, and under duress, changed its name to League of American Bicyclists, thus ridding itself of its sexist name. One wonders if it has gone to any efforts to eradicate whatever intolerance it may have lingering as a result of its historical exclusionary policies. Smith also documents the challenges black racer Marshall Taylor faced due to a system of racial intolerance on his route to establishing himself as "an international champion, the first black American to do so." (Smith, 1972: 168) It is difficult to know what impact racial discrimination in cycling over 100 years ago might have on cyclists today, but cycling clubs still prominent today are situated in this historical context and this fact is probably not trivial.

The bicycle is a zero-emission vehicle and thus often promoted as an environmentally-friendly transportation alternative. It is expected that those with a high amount of environmental concern do their best to try to restrict their automobile use and replace as many trips as possible with public transit, walking and cycling. Forester points out that cycling environmentalists, similar to vehicular cycling professionals, can withstand the negative social pressure cyclists often experience. Despite these similarities, and although Forester stops short of concluding that vehicular cyclists are not environmentalists, he does distance vehicular cyclists from environmentalists by describing the latter as "those who have already decided to oppose social norms in other matters [and who] tend to be intellectual and liberal even when employed in low-status and low-paying jobs." (Forester, 1994: 21) Forester also criticizes environmentalist cyclists who dislike and fear cars of "irrationally" advocating for separate bike lanes thus causing anti-bikeway cyclists to be accused of being "against the environmental movement." (Forester, 1993: 380) Whether or not some cyclists have stronger environmental concern than others, it is reasonable to assume that there is considerable overlap between cycling and environmentalism and participation in environmental movements is an area in which race has received some attention.

Many authors (eg Epperson, 1994; Seager, 1993) have pointed out that North American environmental movements tend to be populated with and led by middle-class whites. As such, the role of social justice is downplayed "in favor of a program concerned about leisure and recreation, resource and land conservation, and pollution abatement.... Predictably, the use of an environmental appeal to motivate voluntary bicycle users to leave their cars in the garage and ride to work proved successful in only a few American cities with a large percentage of young, wealthy and well-educated citizens..." (Epperson, 1994: 6) And, as Epperson points out, it is primarily voluntary cyclists who can afford to devote several hours per week to recreational club riding.

So both the club cyclists on the one hand, and the environmentalists on the other, are more likely to be white, middle-class professionals who have chosen cycling from many transportation options available to them. Epperson argues that instead of providing for these people, planners should instead focus on the needs of those who would rather not cycle! This entails circumventing the traditional forms of public involvement in which it is only voluntary cyclists who set the agenda and

go directly to the poor and people of colour to listen to what their needs are. "Often the talk will be not of bicycling, but of safety, fairness, and empowerment... The traditional argument of the anti-planning advocates is that the weak cannot be accommodated without disadvantaging the strong. Perhaps this is so, particularly in the short run. However, in not doing so we will continue to restrict the use of the bicycle to a small minority of users, almost all of whom have other transportation alternatives available. (Epperson, 1994: 8) This is fatal flaw of policy-making generally as it is often strongly impacted by lobbying, so those who have no special interest in the topic, yet are nonetheless adversely affected, are not heard.

A final note about transportation and race in more general terms. There have been several U.S. studies (eg Bullard, 1994; Mann, 1996; Freund & Martin, 1993) which have looked at the social justice implications of transportation policies on the poor and people of colour. "African-Americans make fewer trips by automobile than other Americans" (Smith Lea, 2000: 55) and are more affected by widespread pro-car policies. These include reduced and costlier public transit service, "disproportionate impact of freeway expansion on the air quality of inner-city neighborhoods" (Epperson, 1994: 7), increased danger and noise due to close proximity to heavy traffic, and a higher rate of pedestrian and cyclist injury and death due to increased exposure. However, despite the fact that these are indisputably negative effects, there do seem to be cultural differences in relation to street life which are largely not considered. There are advantages to living in a dense, busy neighbourhood which suburban whites typically do not understand.

Research undertaken in the 1970s to examine the effects of traffic on residents found some surprising results. Appleyard (1981) categorized four types of streets (light, medium, heavy and very heavy) in San Francisco based on the number of motor vehicles travelling on them per day. Appleyard found that ethnic composition varied considerably, with whites more likely to live on streets with less traffic and visible minorities on streets with more heavy traffic. In fact, race was a better predictor than income because many of the blacks on streets with heavy traffic were of middle income. Contrary to what he expected, Appleyard found that satisfaction was highest on the heavy traffic streets and those residents most impacted by traffic were the least concerned with it, even opposing a scheme to divert and reduce motor vehicles "because they saw it as part of a middle-class invasion... The groups most involved in protecting residential neighborhoods are the young and middle-aged college-educated residents who live in the inner city..." (Appleyard, 1981: 257). Repo (1977) critiques this common practice of middle class professionals moving into predominantly working class neighbourhoods and, with a lack of class or race analysis, using their political clout to create change. Based on an assumption of common interest, such changes are sought with no real understanding that an improvement for one group could impact negatively on another (eg house renovation leads to higher real estate prices and taxes).

To summarize, little has been written specific to race and cycling, but based on the transportation research that does exist one could reasonably assume that differences exist between whites and visible minorities in their attitudes toward cycling. Unfortunately this questionnaire did not differentiate between voluntary and involuntary cyclists so it will not advance any understanding on that count. It is, however, unusual for a survey of this type (especially in Canada which collects

statistics on race less systematically than in the U.S.) to even request information about visible minority status. It was thus difficult to predict how attitudes of visible minority and white respondents might differ toward models of responsibility for cycling safety.

### **Attitudes Toward Social Responsibility**

Although differences between visible minority and white respondents exist in terms of support for social improvements for cycling, a simple correlation matrix finds there is no distinguishable relationship by racial status in terms of social responsibility model type. The mean for whites is 3.30 (SD=.56, n=135) and for visible minorities is 3.15 (SD=.58, n=39) so both groups are in favour. Table 6 shows that for every suggested improvement, white respondents were more in favour than visible minorities. Although it was difficult to know what to expect when comparing attitudes based on this variable, it is still a somewhat surprising result that visible minorities were, although overall in favour, less in favour of social improvements than whites.

Table 6

Support for Social Cycling Improvements by Visible Minority Status (1=strongly disagree, 4=strongly agree)

Improvement Type	White <i>n</i>	Mean	Visible Minority <i>n</i>	Mean	Total <i>n</i>	Mean
<i>Bike Lanes</i>	134	3.77	39	3.64	173	3.74
<i>Lower fines</i>	135	2.84	39	2.59	174	2.79
<i>Motorist Education</i>	134	3.46	38	3.29	172	3.42
<i>Right of way</i>	133	3.14	39	3.08	172	3.13
Total	135	3.30	39	3.15	174	3.27

When the responses were broken down further to separate the cyclists from the non-cyclists, some interesting patterns emerge. Table 7 shows, in contrast to Table 6, the visible minority cyclists actually approved of social improvements slightly more so than did white cyclists in every area except motorist education. So, overall, the scores for cyclists, whether visible minority or not, were similarly high. For cyclists, the mean for whites is 3.34 (SD=.58, n=111) and for visible minorities is 3.38 (SD=.47, n=20). It is the visible minority non-cyclists whose approval of social improvements is slightly lower than white respondents, with the exception of lower fines for cyclists in which visible minorities were markedly lower. For non-cyclists, whites indicated overall weak agreement ( $x=3.14$ , SD=.44, n=24) whereas visible minorities were in weak disagreement ( $x=2.91$ , SD=.60, n=19). In an upcoming section on political beliefs, racial differences and attitudes toward cycling improvements will be explored further.

Table 7

**Support for Social Cycling Improvements by Visible Minority Status & Cycling Status (1=strongly disagree, 4=strongly agree)**

**Non-Cyclists**

Improvement Type	White <i>n</i>	Mean	Visible Minority <i>n</i>	Mean	Total <i>n</i>	Mean
<i>Bike Lanes</i>	24	3.71	19	3.47	43	3.60
<i>Lower fines</i>	24	2.54	19	2.05	43	2.33
<i>Motorist Education</i>	24	3.38	19	3.21	43	3.30
<i>Right of way</i>	24	2.92	19	2.89	43	2.91
<b>Total</b>	<b>24</b>	<b>3.14</b>	<b>19</b>	<b>2.91</b>	<b>43</b>	<b>3.03</b>

**Cyclists**

Improvement Type	White <i>n</i>	Mean	Visible Minority <i>n</i>	Mean	Total <i>n</i>	Mean
<i>Bike Lanes</i>	110	3.78	20	3.80	130	3.78
<i>Lower fines</i>	111	2.91	20	3.10	131	2.94
<i>Motorist Education</i>	110	3.47	19	3.37	129	3.46
<i>Right of way</i>	109	3.19	20	3.25	129	3.20
<b>Total</b>	<b>111</b>	<b>3.34</b>	<b>20</b>	<b>3.38</b>	<b>131</b>	<b>3.34</b>

**Attitudes Toward Personal Responsibility**

Differences between white and visible minority respondents' attitudes toward the personal responsibility cycling model were more marked than they were for social responsibility. The correlation coefficient for personal responsibility type and visible minority status is significant ( $r=.1943$ ,  $n=174$ ,  $p=.010$ ). As the numerical value attributed to whites was 0 and to visible minorities was 1, a positive correlation on visible minority status reveals that visible minorities were more likely to score high on the personal improvement measure. The mean for whites is 2.72 (SD=.88,  $n=135$ ) showing weak disagreement and for visible minorities is 3.15 (SD=.96,  $n=39$ ) indicating weak agreement. Again, although it was difficult to know what to expect, this result is surprising. Why would visible minorities be so much more in favour than white respondents of an individualistic approach to cyclists' safety?

Table 8

**Support for Personal Cycling Improvements by Visible Minority Status (1=strongly disagree, 4=strongly agree)**

Improvement Type	White <i>n</i>	Mean	Visible Minority <i>n</i>	Mean	Total <i>n</i>	Mean
<i>Cyclist education</i>	135	2.74	39	3.17	174	2.84
<i>Helmet law</i>	134	2.71	39	3.13	173	2.80
<b>Total</b>	<b>135</b>	<b>2.72</b>	<b>39</b>	<b>3.15</b>	<b>174</b>	<b>2.82</b>

Table 9 shows the differences between white and visible minority cyclists and non-cyclists. Again, although visible minorities scored higher in each category, there is clearly a cyclist/non-cyclist split on this measure as non-cyclists were in agreement with these measures and cyclists were not. For non-cyclists, the mean for whites is 3.17 (SD=.78, n=24) and for visible minorities is 3.54 (SD=.79, n=19). For cyclists, the mean for whites is 2.63 (SD=.87, n=111) and for visible minorities is 2.79 (SD=.97, n=20). Although each score for visible minorities is higher than it is for whites, the cyclist scores are similar to each other.

Table 9

**Support for Personal Cycling Improvements by Visible Minority Status & Cycling Status (1=strongly disagree, 4=strongly agree)**

#### Non-Cyclists

Improvement Type	White <i>n</i>	Mean	Visible Minority <i>n</i>	Mean	Total <i>n</i>	Mean
<i>Cyclist education</i>	24	3.00	19	3.55	43	3.24
<i>Helmet law</i>	24	3.33	19	3.53	43	3.42
Total	24	3.17	19	3.54	43	3.33

#### Cyclists

Improvement Type	White <i>n</i>	Mean	Visible Minority <i>n</i>	Mean	Total <i>n</i>	Mean
<i>Cyclist education</i>	111	2.69	20	2.80	131	2.71
<i>Helmet law</i>	110	2.57	20	2.75	130	2.60
Total	111	2.63	20	2.78	131	2.65

#### Attitudes Toward No Improvement

The response to the statement "Cyclists who know how to ride in traffic and obey traffic laws are safe on any Toronto street" revealed visible minority differences that were somewhat different than those found in the responses to the social and personal models of responsibility. The correlation coefficient for this variable and visible minority status is significant ( $r=.1777$ ,  $n=141$ ,  $p<.05$ ). As the numerical value attributed to white respondents was 0 and to visible minorities was 1, a positive correlation on visible minority status reveals that visible minorities were more likely to score high on this measure. The mean for whites is 2.15 (SD=1.09,  $n=117$ ) and for visible minorities is 2.67 (SD=1.01,  $n=24$ ). So this is consistent with the response to the personal responsibility model in that visible minorities scored higher than white respondents. As Table 10 shows, the responses to this variable were very similar (weak disagreement) for all respondents whether they were cyclists or not and regardless of visible minority status. Surprisingly, it was the visible minority *cyclists* who scored much higher than every other group. For non-cyclists, the mean for whites is 2.25 (SD=1.02  $n=20$ ) and for visible minorities is 2.17 (SD=.98,  $n=6$ ). For cyclists, the mean for whites is 2.13 (SD=1.11  $n=97$ ) and for visible minorities is 2.83 (SD=.99,  $n=18$ ). This seems to indicate that visible minority cyclists have a strong belief in the ability of cyclists to look after themselves on city streets. It should

be noted that interpretations based on this data must be made cautiously as not only was the sample non-random but the respondents who indicated themselves as visible minorities (39) was a small proportion of the total (174).

Table 10

Support for No Cycling Improvement by Visible Minority & Cycling Status (1=strongly disagree, 4=strongly agree)

Cycling Status	White <i>n</i>	Mean	Visible Minority <i>n</i>	Mean	Total <i>n</i>	Mean
<i>Non-Cyclists</i>	20	2.25	6	2.17	26	2.23
<i>Cyclists</i>	97	2.13	18	2.83	115	2.24
Total	117	2.15	24	2.67	141	2.24

### 3. Political Beliefs and Attitudes toward Responsibility for Cycling Safety

#### **Background**

Does a relationship exist between political beliefs and convictions about how cycling safety is best achieved? If such a relationship does exist it may provide evidence that the discourse around improving safety can be politically motivated. It could also demonstrate that one's politics impacts upon one's convictions about what is the best way to achieve safe conditions for cyclists. Certainly John Forester with his outspoken individualistic views is seemingly at the forefront of those who mix politics and cycling. But Forester denies political motivation and describes his libertarian values as those reflecting a neutral "real" cyclist position as distinct from politically motivated "inexperienced" cyclists. He advises transportation engineers to seek out the former and disregard the rest. "If you don't know the clubs in your area, first ask the better bicycle shops... Assume, until you know otherwise, that those who have initiated contact with you are political bicyclists, and that real cyclists have seen no useful reason to contact government. (Forester, 1994: 164) But is it logical to assume that those cyclists who stay away from government are doing so because they are not political, and by the same token, that those cyclists who do advocate for change are inevitably political?

According to Forester, "political activism is not a natural result of the vehicular-cycling principle" (Forester, 1994: 20) especially for a competitive cycling racer who, "if government leaves him alone he'll leave it alone--he hasn't time for political action. (Forester, 1994: 55) Indeed as long as the status quo is maintained, vehicular cyclists have reason to be content because their views are reflected in governmental policies but it is not proof that they are any less political. Indeed, it is somewhat disingenuous of Forester to claim to operate outside of politics. In fact his preface to *Effective Cycling* includes descriptions of political battles he has fought, from repealing mandatory bikeway laws to changing traffic laws to affecting bicycle manufacturing standards. In fact he admits that the writing of his instructional program which teaches cyclists how to ride in traffic was political. "My original intent was partly political; I intended to disseminate the principles, understanding, and practice of proper cycling in traffic in order to protect cyclists from bike-safety programs, bikeways, and restrictive laws." (Forester, 1993: xvii) So in fact Forester is quite politicized and was politically active

during the 1970s when the building of bikeways was a more popular governmental commitment than it is now. If such a commitment were to return, there is no reason not to expect that vehicular cyclists would indeed find time for political action to stave off bikeway implementation.

The Toronto Cycling Committee (formerly the Toronto City Cycling Committee or the TCCC prior to the amalgamation of Toronto in 1997) has historically provided a good model of compromise between the viewpoints of the vehicular cyclists and the bikeway advocates. From its inception in 1975 it has had a threefold mandate of bicycle promotion, vehicular cycling education and bikeway planning. This mandate offers the possibility of a compromise between opposing viewpoints as it on the one hand embraces Forester's instructional program and on the other encourages people to cycle and plans for separated bicycle lanes and paths. The purists on either side are not entirely happy with this arrangement but, considering the challenging task of finding common ground between these philosophies, it is remarkable that the Toronto Cycling Committee's mandate has remained. The only way that it manages to get anything done at all is by either the vehicular cyclists or the bikeway advocates holding their noses while voting. Unfortunately the years have not served to moderate the more extreme positions.

Wallace (1992) documents the evolution of the TCCC in which he describes the committee's early days as "prone to battles between strong personalities, a condition not unknown to most volunteer groups." (Wallace, 1992: 517) In fact it took 14 years to work through their arguments about bike lanes before they could finally arrive on a Committee position. "Bike lanes have often been a topic of hot debate for the committee. Members could not reach consensus in favour of bike lanes until 1989." (Wallace, 1992: 518) Since that time several bicycle lanes have been installed in Toronto and although there are always members on the committee who dislike bicycle lanes there is a certain reluctant acceptance that they are important. In recent years, the planning and implementation of bicycle lanes has moved from the urban development planning department to the transportation services department which embeds it within basic infrastructure planning and stabilizes its funding.

Some tension still exists around bicycle promotion however which is not surprising given Forester's extreme views about the subject. He claims that "one distinguishing mark of cycling clubs and organizations is that they exist to improve cycling for those who choose to cycle. The too typical bicycle political organization believes that its intent is to make cycling better for everybody." (Forester, 1994: 156) Making cycling better for everybody is indeed in the Toronto Cycling Committee's mandate, yet it also offers *Effective Cycling* instruction which makes for a very difficult balancing act. It is not that bicycle promotion is incompatible with cycling training. Actually, the opposite is more often the case, especially if one looks outside of Canada.

Countries with high rates of cycling provide extensive cycling instruction in combination with their programs of widespread bicycle infrastructure, restrictions on auto use, mandatory driver training and traffic regulations favouring pedestrians and cyclists. "Traffic education of children has high priority in both The Netherlands and Germany. Every school provides comprehensive programs to educate children to walk and bicycle safely." (Pucher & Dijkstra, 2000: 23) What is evident from the European approach is the importance of cycling education as one aspect of many which improve

conditions for cyclists. In this way Toronto's Cycling Committee has the right idea but needs to make a concerted effort to separate the politics embedded within its educational program. Whether or not it can do so when it utilizes a training method with historical roots in elitist club cycling is unknown. Certainly it has not been able to do so up to this point. Clearly though this is not the only difficulty facing the Committee in this regard. As a mandatory school cycling safety program does not exist in Canada, the Committee finds itself teaching skills to only a very small fraction of Toronto's cyclists and potential cyclists. Additionally a good proportion of its programs teaches adults, not children, cycling skills. These factors actually increase the complexity of the Cycling Committee's education program, yet it has vastly inferior funding, systemic and political support than such programs do in European countries.

Just how big a role does politics play in attitudes toward cycling safety in Toronto? With the exception of Forester's *Effective Cycling* influence, there is little of a concrete nature to point to which addresses this question. This questionnaire made an attempt to understand if such linkages exist. It was predicted that right-wing voters would favour an individual responsibility model while left-wing voters would align themselves more closely with the social responsibility model. If the existence of such a pattern were established it could partially account for the politically charged nature of cycling safety discourse.

#### **Attitudes Toward Social Responsibility**

Although respondents from all political parties were in favour of social improvements for cycling, Table 11 shows that for each measure left-wing voters were more in favour than right-wing voters. The correlation coefficient for social responsibility type and political belief is significant ( $r=.3096$ ,  $n=132$ ,  $p<.001$ ). As the more right-wing political parties (ie Tory, Liberal) were attributed values of 1 and 2 and the more left-wing political parties (ie NDP, Green) were attributed values of 3 and 4, this positive correlation reveals that, as predicted, those who have more conservative political beliefs are less supportive of social improvements for cycling. The mean for more right-wing voters (Tory, Liberal) is 3.09 (SD=.53,  $n=60$ ) and for more left-wing voters (NDP, Green) is 3.43 (SD=.55,  $n=72$ ).

Table 11

Support for Social Cycling Improvements by Political Orientation (1=strongly disagree, 4=strongly agree)

Improvement Type	Right-Wing <i>n</i>	Mean	Left-Wing <i>n</i>	Mean	Total <i>n</i>	Mean
<i>Bike Lanes</i>	60	3.65	71	3.80	131	3.73
<i>Lower fines</i>	60	2.47	72	3.00	132	2.76
<i>Motorist Education</i>	58	3.28	72	3.64	130	3.48
<i>Right of way</i>	60	2.97	72	3.26	132	3.13
<b>Total</b>	60	3.09	72	3.43	132	3.27

When the responses were broken down further to separate the cyclists from the non-cyclists, it becomes clear that, with the exception of attitudes toward lower fines, the political differences exist more strongly between non-cyclists than they do between cyclists. Table 12 shows that left-wing respondents were more consistently pro-social improvements regardless of cycling status. In fact, left-wing non-cyclists were slightly more in favour of social improvements than were cyclists. Right-wing respondents, on the other hand, answered quite differently depending on whether or not they were cyclists. If they were, their attitudes were very similar to those expressed by left-wing cyclists. Right-wing non-cyclists, in every measure but one, expressed the weakest agreement with social improvements than the other three groups. Overall, however, the data do seem to reveal that, regardless of political belief, the cyclists are more aligned with each other in support for social improvements for cycling. For non-cyclists though, political beliefs seem to play a greater role in their attitudes about cycling and the gap is wider than it is between cyclists.

Table 12

Support for Social Cycling Improvements by Political Orientation & Cycling Status (1=strongly disagree, 4=strongly agree)

#### Non-Cyclists

Improvement Type	Right-Wing <i>n</i>	Mean	Left-Wing <i>n</i>	Mean	Total <i>n</i>	Mean
<i>Bike Lanes</i>	22	3.45	13	3.92	35	3.63
<i>Lower fines</i>	22	2.32	13	2.15	35	2.26
<i>Motorist Education</i>	22	3.00	13	3.85	35	3.31
<i>Right of way</i>	22	2.50	13	3.46	35	2.86
Total	22	2.82	13	3.35	35	3.01

#### Cyclists

Improvement Type	Right-Wing <i>n</i>	Mean	Left-Wing <i>n</i>	Mean	Total <i>n</i>	Mean
<i>Bike Lanes</i>	38	3.76	58	3.78	96	3.77
<i>Lower fines</i>	38	2.55	59	3.19	97	2.94
<i>Motorist Education</i>	36	3.44	59	3.59	95	3.54
<i>Right of way</i>	38	3.24	59	3.22	97	3.23
Total	38	3.25	59	3.44	97	3.37

#### Attitudes Toward Personal Responsibility

A significant relationship exists between personal responsibility model type and political belief ( $r=-.2167$ ,  $n=163$ ,  $p<.01$ ), the negative correlation revealing that those voting conservatively were more likely to score high on the personal improvement measure. The mean for right-wing voters (Tory, Liberal) is 3.05 (SD=.88,  $n=60$ ) and for left-wing voters (NDP, Green) is 2.76 (SD=.86,  $n=72$ ). Table 13 shows, as predicted, that right-wingers were more in favour of the efforts of the individual cyclist to

look after his/her own safety. However, both the right and left-wing were in favour of personal improvements for cycling, albeit to a weaker extent than for social improvements.

Table 13

Support for Personal Cycling Improvements by Political Orientation (1=strongly disagree, 4=strongly agree)

Improvement Type	Right-Wing <i>n</i>	Mean	Left-Wing <i>n</i>	Mean	Total <i>n</i>	Mean
<i>Cyclist education</i>	60	3.08	72	2.79	132	2.92
<i>Helmet law</i>	60	3.03	71	2.73	131	2.87
Total	60	3.05	72	2.76	132	2.89

Again, analyzing the differences in attitudes expressed by cyclists and non-cyclists, Table 14 shows a pattern that is reverse that seen for social improvements in which there was considerable variation in attitudes expressed by right-wing cyclists and non-cyclists. For personal improvements, attitudes are more polarized for left-wing respondents. Left-wing respondents who were not cyclists were actually more in favour of personal improvements than were right-wing respondents. Left-wing cyclists were in disagreement with personal improvements whereas their left-wing non-cyclist counterparts were in agreement. The variation amongst right-wing respondents was less marked. Contrary to the social improvements measure in which cyclists, regardless of their politics, were similarly in favour, there was more variability in cyclists attitudes toward the personal responsibility model depending upon their political beliefs.

Table 14

Support for Personal Cycling Improvements by Political Orientation & Cycling Status (1=strongly disagree, 4=strongly agree)

Non-Cyclists

Improvement Type	Right-Wing <i>n</i>	Mean	Left-Wing <i>n</i>	Mean	Total <i>n</i>	Mean
<i>Cyclist education</i>	22	3.16	13	3.23	35	3.19
<i>Helmet law</i>	22	3.09	13	3.69	35	3.31
Total	22	3.13	13	3.46	35	3.25

Cyclists

Improvement Type	Right-Wing <i>n</i>	Mean	Left-Wing <i>n</i>	Mean	Total <i>n</i>	Mean
<i>Cyclist education</i>	38	3.03	59	2.69	97	2.82
<i>Helmet law</i>	38	3.00	58	2.52	96	2.71
Total	38	3.01	59	2.60	97	2.76

### Attitudes Toward No Improvement

Is the status quo sufficient for ensuring cyclists' safety? Right-wing voters are more likely to believe that it is while left-wing voters disagree. The correlation coefficient for this measure and political belief is significant ( $r=-.2448$ ,  $n=107$ ,  $p<.05$ ) which indicates the average score for the right-wing was significantly higher than that of left-wing respondents. The mean for more right-wing voters is 2.52 ( $SD=1.13$ ,  $n=44$ ) which indicates slight disagreement and for more left-wing voters is 1.97 ( $SD=1.06$ ,  $n=63$ ) indicating strong disagreement. However, as Table 15 clearly shows this difference lies almost entirely with the cyclists. Right-wing non-cyclists scored slightly higher than left-wing but both were in weak agreement with the statement, "Cyclists who know how to ride in traffic and obey traffic laws are safe on any Toronto street." The difference between the right-wing and left-wing cyclists was much more marked. The right-wing cyclists were in stronger agreement while the left-wing cyclists were in weak disagreement. This result is unlike what was found in the attitudes of respondents toward personal improvements that the greatest differences existed between left-wing cyclists and non-cyclists. It also differs from the attitudes of cyclists toward social improvements that, regardless of political beliefs, were more similar to each other than if they were not cyclists. On this measure of no improvement it is the non-cyclists who are more similar, regardless of political beliefs whereas for cyclists this statement is more politically loaded. This is expected given that a position of no improvement for cyclists is a polarized position within the cycling community but not within the general population.

Table 15

Support for No Cycling Improvement by Political Orientation & Cycling Status (1=strongly disagree, 4=strongly agree)

Cycling Status	Right-Wing <i>n</i>	Mean	Left-Wing <i>n</i>	Mean	Total <i>n</i>	Mean
<i>Non-Cyclists</i>	11	2.27	10	2.20	21	2.24
<i>Cyclists</i>	33	2.61	53	1.92	86	2.19
Total	44	2.52	63	1.97	107	2.20

### Political Beliefs, Sex Differences and Attitudes Toward Cycling Improvements

As political beliefs appear to play a role in attitudes toward cycling safety measures, and it has been established that there are also sex differences, a closer look at the political profiles of male and female respondents is warranted. Table 16 shows the way political orientation manifests itself by sex. For both men and women the largest percentage of respondents were left-wing voters, with male left-wing support being slightly higher than female. A greater percentage of female respondents than male were undecided as to how they would vote in the next election or declined to divulge this information. Overall though the political differences between men and women were minimal.

Table 16

Sex Differences in Political Orientation

Political Orientation	Men <i>n</i>	Men %	Women <i>n</i>	Women %	Total <i>n</i>	Mean
<i>Right-Wing</i>	31	35%	29	32%	60	34%
<i>Left-Wing</i>	38	43%	34	38%	72	40%
<i>Don't Know/No Answer</i>	20	22%	27	30%	47	26%
<b>Total</b>	<b>89</b>	<b>100%</b>	<b>90</b>	<b>100%</b>	<b>179</b>	<b>100%</b>

To gain a further understanding of the role political differences may have played in respondents' attitudes toward cycling, an analysis was completed in which sex differences were re-examined while controlling for political orientation. Sex differences, in terms of support for social cycling improvements, were initially outlined in Table 1 and political differences in Table 11. Table 17 shows that sex differences for social improvements exist amongst right-wing respondents but not the left-wing. Left-wing respondents, regardless of sex, indicated strong approval for social improvements. The male right-wing respondents registered mild support for these improvements whereas right-wing female respondents were in weak disagreement. This adds greater definition to the findings pertaining to sex differences that were previously hidden—namely that it is the female *right-wing* respondents who show reluctance to support social responsibility measures whereas the differences between male and female left-wing respondents are non-existent. For social improvements, then, separating out right-wing respondents from left-wing actually uncovers sex differences that were not showing previously. Thus political beliefs accentuate the differences between the sexes.

Turning to support for personal improvements, (refer to Table 3 for overall sex differences and to Table 13 for political differences), the sex differences were found to be greater between the left-wing respondents than the right-wing. The male and female right-wing mean scores were closer to each other than were the left-wing mean scores, even though the average score for right-wing women indicates weak *agreement* with personal cycling improvements while right-wing men registered weak *disagreement*. Both male and female left-wing respondents, overall, indicated disagreement with personal cycling improvements, but men more so than women. Again, it is through examining political beliefs more closely that greater definition is given to differences between male and female respondents. Political beliefs accentuate the differences between the sexes on this measure.

Finally, in response to the statement suggesting that the current traffic environment for cyclists may be sufficient (see Table 5 for overall sex differences and Table 15 for political differences), the differences between the mean scores for the sexes were fairly stable regardless of political beliefs. Right-wing men registered greater agreement with this statement than did right-wing women. Similarly the average score for left-wing men was higher than for left-wing women. However, the gap between the left-wing sexes is less than that between right-wing men and women. Overall, right-wing respondents weakly disagree whereas left-wing respondents strongly disagree. For this statement, then, it is sex that seems to be a better predictor of response than political beliefs.

Table 17

**Support for Cycling Improvements by Political Orientation & Sex (1=strongly disagree, 4=strongly agree)**

**Right-Wing**

Improvement Type	Male <i>n</i>	Mean	Female <i>n</i>	Mean	Total <i>n</i>	Mean
<i>Social Cycling Improvements</i>	31	3.21	29	2.97	60	3.09
<i>Personal Cycling Improvements</i>	31	2.93	29	3.19	60	3.05
<i>No Cycling Improvement</i>	28	2.64	16	2.31	44	2.52

**Left-Wing**

Improvement Type	Male <i>n</i>	Mean	Female <i>n</i>	Mean	Total <i>n</i>	Mean
<i>Social Cycling Improvements</i>	37	3.42	34	3.42	71	3.42
<i>Personal Cycling Improvements</i>	37	2.51	34	2.99	71	2.74
<i>No Cycling Improvement</i>	36	2.06	27	1.85	63	1.97

**Political Beliefs, Visible Minority Status Differences and Attitudes Toward Cycling Improvements**

The differences between visible minorities and white respondents is another significant factor to study in order to reach a better understanding of the interaction between political beliefs and visible minority status is warranted. Indeed, as Table 18 indicates, political orientation differences by visible minority status were quite marked. A much greater percentage of visible minorities than whites indicated that they will vote for the Tories or the Liberals in the next provincial election. Similarly, a much greater percentage of white respondents than visible minorities will vote NDP or Green. Visible minority respondents, more than whites, were undecided as to how they would vote in the next election or declined to divulge this information. The political orientation of the respondents, then, may well lend some insight into the differences that were found in terms of support for the social and individual responsibility models of cycling safety.

Table 18

Visible Minority Status Differences in Political Orientation

Political Orientation	White <i>n</i>	White %	Visible Minority <i>n</i>	Visible Minority %	Total <i>n</i>	Mean
<i>Right-Wing</i>	39	29%	21	54%	60	34%
<i>Left-Wing</i>	63	46%	6	15%	69	39%
<i>Don't Know/No Answer</i>	34	25%	12	31%	46	26%
<b>Total</b>	<b>136</b>	<b>100%</b>	<b>39</b>	<b>100%</b>	<b>175</b>	<b>100%</b>

To gain a further understanding of the role political differences may have played in respondents' attitudes toward cycling, an analysis was completed in which visible minority differences were re-examined while controlling for political orientation. Visible minority differences, in terms of support for social cycling improvements, were initially outlined in Table 6 and political differences in Table 11. Table 19 shows that visible minority differences for social improvements, similar to sex differences, are greater amongst right-wing respondents than left-wing. Left-wing respondents, regardless of visible minority status, indicated strong approval for social improvements. It should be noted, though, that as most visible minority respondents voted right-wing, the number of left-wing visible minority respondents was quite small. The white right-wing respondents registered mild support for these improvements whereas right-wing visible minority respondents were in weak disagreement. This adds greater definition to the findings pertaining to visible minority differences that were previously hidden--namely that it is the visible minority *right-wing* respondents who show reluctance to support social responsibility measures whereas the differences between white and visible minority left-wing respondents are negligible. These visible minority status differences did not show up previously. For social improvements, then, political beliefs accentuate the differences between visible minority and white respondents.

Turning to support for personal improvements, (refer to Table 8 for overall visible minority status differences and to Table 13 for political differences), the differences between visible minorities and whites are reduced by separating the left-wing respondent from the right. This is a direct contrast to what was found in terms of sex differences (that political beliefs accentuate differences). Even though the differences were less marked than when visible minority status was analyzed without controlling for political beliefs, there were nonetheless differences found. As can be seen in Table 19, most visible minorities identified with more right-wing political parties but there were a small number of left-wing visible minorities and their support for personal cycling improvements was similar to that of white respondents -- weak disagreement. The right-wing white and visible minority respondents were somewhat more different from each other in terms of support for this measure. Right-wing white respondents indicated weak *disagreement* while their visible minority counterparts indicated weak *agreement* with personal cycling improvements. This analysis has shown that it is right-wing visible minority respondents who are in agreement with personal cycling improvements. Left-wing visible minorities and both left- and right-wing white respondents disagreed with the implementation of

individualistic cycling safety measures. Overall though this analysis shows that political beliefs carry more weight on this measure than does visible minority status.

Finally, in response to the statement suggesting that the current traffic environment for cyclists may be sufficient (see Table 10 for overall visible minority status differences and Table 15 for political differences), the visible minority status differences are found to exist entirely amongst right-wing respondents. Table 19 shows that left-wing respondents, regardless of visible minority status, indicated identical strong disagreement with this statement. The white right-wing respondents registered moderate *disagreement* while the visible minority right-wing respondents were in weak *agreement*. This analysis has better clarified that the support for the status quo, amongst the visible minority respondents, lies with those who are right-wing. Left-wing visible minorities and both left- and right-wing white respondents disagreed that the current traffic environment is sufficient for cyclists. This analysis shows that political beliefs accentuated the differences between visible minority and white respondents in terms of response to this statement.

Table 19

Support for Cycling Improvements by Political Orientation & Visible Minority Status (1=strongly disagree, 4=strongly agree)

**Right-Wing**

Improvement Type	White <i>n</i>	Mean	Visible Minority <i>n</i>	Mean	Total <i>n</i>	Mean
<i>Social Cycling Improvements</i>	39	3.17	21	2.95	60	3.09
<i>Personal Cycling Improvements</i>	39	2.95	21	3.25	60	3.05
<i>No Cycling Improvement</i>	33	2.33	11	3.09	44	2.52

**Left-Wing**

Improvement Type	White <i>n</i>	Mean	Visible Minority <i>n</i>	Mean	Total <i>n</i>	Mean
<i>Social Cycling Improvements</i>	62	3.43	6	3.5	68	3.42
<i>Personal Cycling Improvements</i>	62	2.73	6	2.83	68	2.74
<i>No Cycling Improvement</i>	57	2.0	4	2.0	61	2.0

**4. Environmental Concern and Attitudes toward Responsibility for Cycling Safety**

**Background**

A previous section (#2--Visible Minorities) touched upon some of the issues relating to environmentalism and cycling. In that section two criticisms were raised from different sources about environmentalists venture into cycling issues. One criticism was expressed by Forester who asserts that environmentalists "with relatively little cycling experience" (Forester, 1994: 156) have strong beliefs about separating bicycles from cars based not on a love of cycling but on anti-car sentiments.

According to Forester, environmentalists' experience should thus be discounted and transportation engineers should focus on the needs of cycling experts only. Epperson is one among many who have labelled Forester's viewpoint elitist. Yet, as Epperson points out, it is not just vehicular cyclists that have an elitist approach. Epperson critiques the North American environmental movement because the causes it tends to champion benefit middle-class environmentalists sometimes to the detriment of the poor. When it comes to cycling, environmentalists are no different from Forester in that they typically concentrate only on those who are, or could be, voluntary cyclists with transportation choice. Epperson stresses the importance of bringing the involuntary cyclist into the bicycle planning process so that it is not just the needs of the middle class, whether they be vehicular cyclists and/or environmentalists, which are understood.

Within the environmental community itself there is also some division over the anti-car position that some cyclists hold. Bob Hunter, a veteran environmentalist and Greenpeace co-founder, recently admitted in his weekly column that he is an "autoholic" and sees no reason to stop driving because zero-emission cars are just around the corner. He was subsequently blasted with indignant letters from cyclists who felt betrayed by Hunter's unwillingness to make personal sacrifices for the greater good. Environmentalists, with their "if you're not part of the solution, you're part of the problem" philosophy, tend to take seriously the position that individuals can live by example and thus affect change. Hunter directing the "urban, bicycle-riding, granola-eating hordes of vegetarian Ecological Footprint-reduction fetishists [to] lay off the car" (eye weekly, March 9, 2000) also understandably upset cyclists. What is clear by the vehemence of Hunter's attack is that he feels guilty for breaking rank with other environmentalists and deciding his personal choices are *unpolitical*.

Despite these examples, generally speaking it is fairly uncommon for individuals choosing to ride for environmental reasons to be openly criticized. Governments regularly promote cycling as a healthy transportation choice, not only individually but also collectively by reducing the numbers of cars and resulting pollution. Given this, it was predicted that those who had high environmental concern would also be in favour of social improvements for cyclists.

### **Attitudes Toward Social Responsibility**

There were very few in this sample that had low environmental concern. On a 4 point scale, the overall mean on this measure is 3.60 (SD=.65, n=178) so this fact needs to be taken into consideration as these results are interpreted. However, as predicted, there was a positive correlation between social responsibility model type and environmental concern ( $r=.1547$ ,  $n=178$ ,  $p<.05$ ) which shows that those who are supportive of social improvements for cycling also score high on the environmental concern measure. The mean for those who have weaker environmental concerns is 3.04 (SD=.72, n=14) and for those with a higher degree of environmental concern is 3.29 (SD=.56, n=164). As shown in Table 20, those with higher environmental concern scored higher on each of the components making up the social improvements measure, with the exception of lower fines for cyclists in which they were slightly less in favour of than those with lower environmental concern.

Table 20

**Support for Social Cycling Improvements by Environmental Concern (1=strongly disagree, 4=strongly agree)**

Improvement Type	Lower Concern <i>n</i>	Mean	Higher Concern <i>n</i>	Mean	Total <i>n</i>	Mean
<i>Bike Lanes</i>	14	3.43	163	3.76	177	3.73
<i>Lower fines</i>	14	2.86	164	2.78	178	2.79
<i>Motorist Education</i>	13	2.77	163	3.48	176	3.43
<i>Right of way</i>	13	3.00	163	3.15	176	3.14
<b>Total</b>	14	3.04	164	3.29	178	3.27

Table 21 shows how the responses of cyclists and non-cyclists differed. On the composite social improvements measure cyclists with high environmental concern were the most in favour ( $x=3.36$ ,  $SD=.55$ ,  $n=123$ ). However there was considerable variation expressed by group in response to each of the individual improvements. For example, non-cyclists with low environmental concern were the most in favour of bike lanes. This could be evidence to support Forester's theory that motorists favour bike lanes because it gets cyclists out of their way. This interpretation is further supported by the fact that this group is also dramatically less in favour of motorist education than the rest of the sample. Surprisingly however non-cyclists with low environmental concern were the most in favour of lower fines for cyclists. These interpretations must be considered very cautiously due to the extremely small size of this group. Cyclists and non-cyclists were similarly in favour of cyclists having right of way, with cyclists with high environmental concern the most in favour.

Table 21

**Support for Social Cycling Improvements by Environmental Concern & Cycling Status (1=strongly disagree, 4=strongly agree)**

**Non-Cyclists**

Improvement Type	Lower Concern <i>n</i>	Mean	Higher Concern <i>n</i>	Mean	Total <i>n</i>	Mean
<i>Bike Lanes</i>	4	4.00	41	3.56	45	3.60
<i>Lower fines</i>	4	3.25	41	2.29	45	2.38
<i>Motorist Education</i>	4	2.00	41	3.46	45	3.33
<i>Right of way</i>	4	3.00	41	2.95	45	2.96
<b>Total</b>	4	3.06	41	3.07	45	3.07

## Cyclists

Improvement Type	Lower Concern <i>n</i>	Mean	Higher Concern <i>n</i>	Mean	Total <i>n</i>	Mean
<i>Bike Lanes</i>	10	3.20	122	3.83	132	3.78
<i>Lower fines</i>	10	2.70	123	2.94	133	2.92
<i>Motorist Education</i>	9	3.11	122	3.48	131	3.46
<i>Right of way</i>	9	3.00	122	3.21	131	3.20
Total	10	3.03	123	3.36	133	3.34

**Attitudes Toward Personal Responsibility**

The correlation between personal responsibility model type and environmental concern was not significant. However those who were supportive of personal improvements for cycling also scored higher on the environmental concern measure than those who were not supportive. The mean for those who have weaker environmental concerns is 2.46 (SD=.99, n=14) and for those with a higher degree of environmental concern is 2.87 (SD=.90, n=164). As shown in Table 22, those with higher environmental concern scored higher on both of the components making up the personal improvements measure. As those with high environmental concern also scored high on the social improvement measure this seems to indicate that this group is generally in favour of increased safety for cyclists without differentiating the form that that safety takes.

Table 22

Support for Personal Cycling Improvements by Environmental Concern (1=strongly disagree, 4=strongly agree)

Improvement Type	Lower Concern <i>n</i>	Mean	Higher Concern <i>n</i>	Mean	Total <i>n</i>	Mean
<i>Cyclist education</i>	14	2.50	164	2.88	178	2.85
<i>Helmet law</i>	14	2.43	163	2.87	177	2.83
Total	14	2.46	164	2.87	178	2.84

Analyzing the differences in attitudes expressed by cyclists and non-cyclists, Table 23 shows that non-cyclists with high environmental concern were markedly more in favour of personal improvements than were the other three groups. This strengthens the likelihood of the interpretation that this group is generally in favour of increased safety for cyclists without differentiating the form that that safety takes. Cyclists, regardless of environmental concern, were much less in favour of personal improvements. However, interestingly, those cyclists with high environmental concern scored slightly higher ( $x=2.67$ ,  $SD=.89$ ,  $n=123$ ) than those with low environmental concern ( $x=2.50$ ,  $SD=.75$ ,  $n=10$ ), which indicates that a more individualistic approach to cycling safety is not equated with a lack of environmental concern.

Table 23

**Support for Personal Improvements by Environmental Concern & Cycling Status (1=strongly disagree, 4=strongly agree)**

**Non-Cyclists**

Improvement Type	Lower Concern <i>n</i>	Mean	Higher Concern <i>n</i>	Mean	Total <i>n</i>	Mean
<i>Cyclist education</i>	4	2.50	41	3.35	45	3.28
<i>Helmet law</i>	4	2.25	41	3.56	45	3.44
<b>Total</b>	<b>4</b>	<b>2.38</b>	<b>41</b>	<b>3.46</b>	<b>45</b>	<b>3.36</b>

**Cyclists**

Improvement Type	Lower Concern <i>n</i>	Mean	Higher Concern <i>n</i>	Mean	Total <i>n</i>	Mean
<i>Cyclist education</i>	10	2.50	123	2.72	133	2.70
<i>Helmet law</i>	10	2.50	122	2.63	132	2.62
<b>Total</b>	<b>10</b>	<b>2.50</b>	<b>123</b>	<b>2.67</b>	<b>133</b>	<b>2.66</b>

**Attitudes Toward No Improvement**

Again, this measure revealed some marked differences between groups. Those with low environmental concern ( $x=2.50$ ,  $SD=.97$ ,  $n=10$ ) were much more likely to believe that conditions for cyclists need no improvement than those with high environmental concern ( $x=2.20$ ,  $SD=1.10$ ,  $n=133$ ). The correlation coefficient for this measure and environmental concern is significant ( $r=-.2615$ ,  $n=143$ ,  $p<.05$ ) indicating that the average score for those with lower environmental concern was significantly higher than those with higher environmental concern. This holds true regardless of cycling status. Cyclists and non-cyclists with high environmental concern were similar in their weak agreement to the statement that cyclists who know what they are doing are safe on any street. Non-cyclists with low environmental concern were the most in agreement but cyclists with low environmental concern were not much lower than non-cyclists. This finding refutes Forester's claim that vehicular cyclists' environmental concern is no lower than that of bikeway advocates although this result must be treated with caution due to the small numbers with low environmental concern in this data set.

Table 24

**Support for No Cycling Improvement by Environmental Concern by Cycling Status (1=strongly disagree, 4=strongly agree)**

Cycling Status	Lower Concern <i>n</i>	Mean	Higher Concern <i>n</i>	Mean	Total <i>n</i>	Mean
<i>Non-Cyclists</i>	3	2.67	23	2.17	26	2.23
<i>Cyclists</i>	7	2.43	110	2.21	117	2.22
<b>Total</b>	<b>10</b>	<b>2.50</b>	<b>133</b>	<b>2.20</b>	<b>143</b>	<b>2.22</b>

## **Conclusion**

Although it was extremely difficult to know what to expect from the data in terms of gender, race, political and environmental concern differences, there were nevertheless some tentative hypotheses made. Briefly put, given that the individual responsibility model disproportionately benefits white men over other groups, it was believed that women, visible minorities, left-wing voters and those with high environmental concern would be more in favour of a social responsibility model of cycling while white men, right-wing voters and those with lower environmental concern would be more in favour of an individual responsibility model. The data produced nothing quite so clear-cut but did reveal some provocative differences that require further research. The findings for each responsibility type within the different groups of interest will be briefly summarized.

### **1. Sex Differences**

There was a high overall agreement amongst the respondents that social improvements for cycling are necessary so differences were fairly insignificant. This could explain why finding trends in the data was so difficult. Women were more in favour of bike lanes than men were but only if they were cyclists. All women, regardless of whether they were cyclists or not, were more in favour of motorist education than men. All men, regardless of whether or not they were cyclists, were more in favour of lower fines for cyclists than women. Finally, men were more in favour of right of way priority for bikes, but only if they were cyclists. So it is very difficult to conclude anything about sex and social responsibility except that the attitudes of both sexes toward this model are overwhelmingly positive. But the tentative hypothesis that women would be more in favour than men was disconfirmed.

There was weaker overall agreement with the personal responsibility model than the social responsibility model but women, whether or not they were cyclists, were more in favour. The hypothesis that men would be more in favour than women of this model was thus disconfirmed.

The overall agreement on "no cycling improvements" measure was much weaker than for either personal or social improvements but men, more than women, were more inclined to agree that the status quo is sufficient. The sex differences were the most marked between cyclists with male cyclists indicating the strongest agreement with this statement whereas female cyclists were the least in agreement. This hypothesis was then confirmed.

### **2. Visible Minority Status**

White respondents overall were slightly more supportive of social improvements for cyclists than were visible minorities *unless* they were cyclists. If so, then they were more in favour than white cyclists on every measure except motorist education. The hypothesis, then, that visible minority respondents would be more in favour than white respondents was only partially confirmed because this holds true only for visible minority *cyclists*.

Visible minority respondents were more in favour of personal improvements than were whites. Even though a clear cyclist difference existed (ie that cyclists were less in favour than non-cyclists), white respondents, regardless of status, indicated weaker agreement with this model than visible minorities. This hypothesis was then disconfirmed.

Contrary to what was expected, visible minority respondents were more in agreement with the "no cycling improvements" item than white respondents. Even more oddly, the score for visible minority *cyclists* was the highest of all. The small sample size must be taken into account here though. Also the political orientation of visible minority respondents must be considered.

### 3. Political Beliefs

Left-wing respondents were more in favour of social improvements than right-wing respondents although political differences were more marked between non-cyclists than cyclists. So the hypothesis that those with left-wing political beliefs would be more in favour of cycling social improvements was confirmed.

As expected, right-wing respondents were more in favour of the personal responsibility model than left-wing respondents were but there was more polarization between left-wing respondents than right-wing. Left-wing non-cyclists were the most in favour while left-wing cyclists were the least in favour. This seems to indicate that left-wing non-cyclists assume that any cycling improvement, personal or otherwise, is a good thing.

As expected right-wing respondents were more in agreement with the "no cycling improvements" item than left-wing respondents were. However the difference lies almost completely with the cyclists. Right-wing cyclists scored the highest and left-wing cyclists scored the lowest with non-cyclists in the middle. This result is unlike what was found in the attitudes of cyclists expressed elsewhere, especially toward social improvements, who regardless of political beliefs were more similar to each other than if they were non-cyclists. This points to the politicized nature of this question.

Further analysis was conducted on two key factors (sex and visible minority status) to determine what role political differences may have played in respondents' attitudes toward cycling. There were minimal differences between men and women as far as political orientation -- the percentages of left- or right-wing men and women were fairly comparable. The analysis that controlled for political beliefs did help to clarify some of the sex differences reported above. It was female *right-wing* respondents only who supported more individualistic cycling improvements and they were also alone in their reluctance to support social responsibility measures.

The political orientation differences between visible minority and white respondents were quite marked. 46% of white respondents indicated they would vote NDP or Green in the next political election in contrast to only 15% of visible minorities. Similarly, 54% of visible minorities are Tory or Liberal voters, compared to only 29% of white respondents. As left-wing respondents were more likely to favour systemic safety measures, this relationship between visible minority status and political orientation is key to understanding why visible minority respondents were more likely to favour an individualistic approach to safety. This is confirmed by an analysis controlling for political beliefs. It was visible minority *right-wing* respondents only who supported more individualistic cycling improvements and who indicated that the current traffic environment is sufficient for cyclists. They were also alone in their reluctance to support social responsibility measures.

#### 4. Environmental Concern

All respondents had a high degree of environmental concern. However those with the highest environmental concern were also the most in agreement with the social responsibility model so this hypothesis was also confirmed. Those with high environmental concern scored higher on every measure with the exception of lower fines for cyclists. Due to the small sample size of non-cyclists with low environmental concern, looking at cyclist/non-cyclist differences did not yield further insights.

Contrary to the tentative hypothesis, those with high environmental concern were also in favour of a personal responsibility approach. In fact non-cyclists with high environmental concern scored the highest, similar to what was found in #3 above (that the group that was expected to be the least in favour agreed the most). As with political beliefs, those with high environmental concern could possibly be considering safety in a global way while disregarding the implications of the individualistic approach. Interestingly, cyclists with high environmental concern also scored higher on this measure than those cyclists with lower environmental concern. This could be evidence that vehicular cyclists, contrary to some conjectures otherwise, *do* have high environmental concern.

As predicted, those with lower environmental concern were more likely to believe that the status quo is serving cyclists well than were those with higher environmental concern.

## **Chapter 5**

### **Who is Willing to Cycle?**

**Research Problem #2:** To describe the barriers and opportunities to encourage utilitarian cycling in Toronto amongst survey respondents at two downtown Toronto universities.

The different strategies people employ in response to perceptions of risk and safety are highly complex, as there is a wide range of experience and attitudes that individuals bring to bear on their transportation choice. For example, some may consider themselves great risk-takers in most areas of their lives but perceive cycling to be too dangerous to consider taking such risks while transporting themselves. Others may not be risk takers at all but cycle because they are convinced that urban cycling is safe or because they have no other transportation choice. Yet others may be convinced that they are participating in a high-risk activity while cycling but enjoy the thrill. This chapter explores the relationship between individual and systemic concerns about cycling safety and the impact on willingness to cycle. As with previous chapters, the way in which these relationships are manifested in different groups is of particular interest (eg sex, race, age).

It is first important to note that a large majority (135 or 75%) of the respondents of this survey was cyclists. This is quite a bit higher than the Decima (2000) survey that found that 48% of Toronto's residents over age 15 are cyclists. It is perhaps not surprising though given that this was a convenience rather than a random sample and those who agreed to participate in a survey about cycling probably had at least some amount of vested interest in the topic. Also, the members of the Toronto Cycling Committee and Advocacy for Respect for Cyclists were surveyed *because* they were cyclists. Of the 135 respondents who identified themselves as cyclists, 25 were recreational cyclists only, 20 were transportational cyclists only and 90 cycled for both transportation and recreation. Transportation is liberally defined as anyone who ever uses a bike in good weather to get to work, school, or for shopping/visiting. This is the same way transportational cyclists are defined in the Decima survey. Despite the fact that the majority of respondents were cyclists, there were considerable differences in the concerns expressed by different groups.

Questionnaire items about cycling safety were divided into two categories--personal concerns and social concerns. The survey respondents identified much fewer individual concerns affecting their attitudes about cycling safety than those pertaining to the traffic environment and urban planning more generally. Overall though the respondents were more likely to disagree than agree with the personal concern statements which means that generally speaking they did not feel that the items presented to them were issues holding them back from cycling. On a 4 point scale, the overall mean on the personal concern measure was 1.69 (SD=.54, n=179). The personal concern score included six elements (listed in descending order of importance to respondents): 1) need to carry passengers and/or heavy loads, 2) not having close friends or family who cycle, 3) health and/or fitness reasons impacting on cycling ability, 4) no access to a bicycle and/or not knowing how to cycle, 5) concern about appearance and the impact cycling has on it, and 6) don't like cycling. The concerns of a social nature were higher amongst respondents. On a 4 point scale, the overall mean on the social concern

measure was 2.42 (SD=.64, n=179). The social concern score included three elements, again listed from the most to least important to the respondents: 1) concern about the amount and speed of motor vehicle traffic, 2) belief that Toronto's weather impacts negatively on cycling, and 3) living too far from most places they need to go to cycle there.

What follows is a closer examination of the concerns and subsequent willingness to cycle of different groups. The first area of interest was sex differences. It has been well established that women cycle less than men do but little is known about why that is. Secondly, race was considered as very little is known or even theorized about possible connections between race and cycling, with the exception of new immigrants. Some believe that new immigrants from countries with high rates of cycling (eg the Netherlands or China) will be more likely to cycle than those who are Canadian born. Others think the opposite: that new immigrants are especially interested in conforming to the ways of their adopted country, thus abandon the bicycle due to its marginalized status in Canada. Both of these theories are plausible but untested, thus the particular interest in new immigrants. Finally, respondents were divided into age categories to discern whether this sample follows the same pattern revealed in other cycling usage surveys: that despite the fact that older North Americans maintain an interest in cycling, it tends to be the young who engage in this activity, especially for transportation.

Willingness to cycle was determined by how participants responded to the question: "Some people would like to ride a bike in Toronto more than they do, even those who already ride. Would you like to cycle more than you do?" There was a great deal of overall interest in this data set in participating in cycling: 64% of 178 respondents answered in the affirmative to this question. Interest was high for both those who already cycle and those who do not. However there were some notable differences between those who already cycle and those that do not but would like to which will be explored further below but first let's turn to sex differences.

### 1. Sex Differences in Willingness to Cycle

*"If I didn't have to sleep, I would ride more!"* (25 yr-old white self-employed male, born in Canada, would like to cycle more, comfortable cycling on any type of road for both recreation and transportation, uses a bicycle as his primary mode of transportation: ID 187)

*"I am generally afraid of the traffic--drivers are very unfriendly and in a hurry--so driving patterns would have to change. I love the situation in Amsterdam--everyone bikes, which makes for a healthier population and a cleaner earth."* (21 yr-old white female university student, born in Poland, would like to cycle but does not presently, uses public transit as her primary mode of transportation: ID 94)

The quotes above lay out a clear dichotomy between the sexes in response to the question, "Some people would like to ride a bike in Toronto more than they do, even those who already ride. Would you like to cycle more than you do?" However, even though sex differences exist in both willingness to cycle and present engagement in the activity, there is also a great deal of overlap between the sexes which makes understanding the data more challenging. Most notably, other male respondents but no women made similar remarks to the man quoted above. By contrast, both sexes expressed sentiments similar to those of the female respondent above. This seems to reflect an overall trend in these data and also in the literature that there exists a small group of men who enjoy

cycling in the current environment but the majority of men and women find cycling in Toronto challenging.

One goal of this study was to come to a better understanding of why it is that transportation cyclists in North America are much more likely to be men. This thesis has explored the individualistic nature of North American cycling safety, expressed in a myriad of ways from policies, legislation and enforcement specific to cycling, and even within cycling pedagogy. The working hypothesis has been that sex differences seen in North American cycling are due to the individualist model in place that encourages primarily macho cyclists and neglects the wider scope of cyclists. European studies have shown that "women in general more than men appreciate the safety effects of [bicycle] facilities..." (McClintock, 1992b: 30) These studies are supported by the fact that in cities where there is extensive bicycle infrastructure, such as in the Netherlands, the cycling gender gap is greatly narrowed as is the age gap. Cycling "...in the Netherlands remains very common for the older age groups, especially older women..." (McClintock, 1992c: 7). In North America, however, women are consistently underrepresented in transportation cycling figures despite the fact that they tend to be more concerned about environmental protection, "are more, often significantly more, pro-transit and anti-car than men," (Freund & Martin, 1993: 51) and would like to cycle (Hardie, 1999). So trying to reach a better understanding of why women cycle less than men was of major interest.

This survey confirmed that sex differences are alive and well in terms of who have the desire to cycle but also in the areas of who is participating in cycling and what their concerns are. Although the majority of respondents identified themselves as cyclists, men were much more likely to do so than women. 84% of the 88 men who responded identified themselves as cyclists while only 67% of the 90 women did. There were differences found by cyclist type also. Female respondents were more likely to either be non-cyclists or to ride for one purpose only whereas the male respondents were more likely to cycle and use their bicycle for more than one function. Looking at the sex split more closely we see that 67% of the 45 non-cyclists were women, only 37% of the 90 cyclists who ride for *both* transportation and recreation were women, 43% of the 115 cyclists who ride for recreation were women (of the 25 cyclists who ride *only* for recreation, 64% were women), and 40% of the 110 cyclists who ride for transportation were women (of the 20 cyclists who ride *only* for transportation, 55% were women.) Despite the fact that this was a convenience sample there is some confidence that these figures are representative of the cycling gender split in Toronto as a larger random survey conducted last year also found that 39% of Toronto's utilitarian cyclists are female. (Decima, 2000: 33)

Of the 115 respondents who would like to cycle or cycle more, 52 were women (58% of all women surveyed) and 63 were men (71%). So for the primary question of whether or not a relationship exists between willingness to cycle and sex, the correlation coefficient ( $r = -.1534$ ,  $n = 177$ ,  $p < .05$ ) shows that men, significantly more than women, are interested in cycling. This is an unexpected result because, as fewer women than men currently cycle in Toronto, it was theorized that a latent desire to cycle exists amongst women. Looking at the gender split more closely we see that indeed the majority of women who do not already cycle have no desire to do so. However the majority of women who are already cyclists do wish to cycle more, especially those who ride for

recreation only. As Table 25 shows, though, a greater percentage of men than women in each cyclist type category expressed a desire to cycle or cycle more than they do presently. The majority of male respondents, including those who are presently non-cyclists, expressed a willingness to cycle.

Table 25

Willingness to Cycle/Cycle More by Cyclist Type & Sex

Cyclist Type	Percentage of respondents wishing to cycle/cycle more					
	Male <i>n</i>	%	Female <i>n</i>	%	Total <i>n</i>	%
<i>Non-cyclists</i>	9	64%	13	43%	22	50%
<i>Transportation cyclists</i>	6	67%	6	55%	12	60%
<i>Recreational cyclists</i>	7	78%	11	69%	18	72%
<i>Both transportation and recreational cyclists</i>	41	72%	22	67%	63	70%
Total	63	71%	52	58%	115	64%

One could conjecture that these sex differences are due to a greater disinterest in cycling for women than men and there does seem to be some truth to this. However it is reasonable to expect that concern for one's safety impacts on one's willingness to cycle. By looking more closely at the different concerns expressed we see that interest in cycling does not tell the whole story about why people are or are not riding. The concerns expressed by the male and female respondents will thus be elaborated.

Personal Concerns

As expected, female respondents had more concerns than men regarding cycling and the correlation coefficient ( $r=-.184$ ,  $n=178$ ,  $p<.05$ ) shows that women have significantly more personal concerns than men do. When this is broken down into cyclist type, as in Table 26, it can be seen that it is only the average score for women non-cyclists and recreational cyclists which was higher than the men's average personal concern score. This could indicate that men who ride for transportation and for both recreation and transportation are more willing than women are to ride despite having personal concerns. Or conversely, it could show that women only ride for transportation or for both transportation and recreation if their personal concerns have been addressed.

Table 26

**Personal Cycling Concerns by Cyclist Type & Sex (1=strongly disagree, 4=strongly agree)**

Cyclist Type	Male <i>n</i>	Mean	Female <i>n</i>	Mean	Total <i>n</i>	Mean
<i>Noncyclists</i>	14	1.99	30	2.17	44	2.11
<i>Transportation cyclists</i>	9	1.72	11	1.69	20	1.71
<i>Recreational cyclists</i>	9	1.68	16	1.97	25	1.86
<i>Both transportation and recreational cyclists</i>	56	1.46	33	1.39	89	1.43
<b>Total</b>	<b>88</b>	<b>1.59</b>	<b>90</b>	<b>1.79</b>	<b>178</b>	<b>1.69</b>

The breakdown by cyclist type for each of the six statements that comprise the personal concerns score is not markedly different from the combined table in Table 25. However, three of the items are of interest to discuss further. The first (Table 27) is the issue about the respondent's need to either transport passengers or other heavy loads. This was the number one concern for women and, with the exception of those women who cycle for both transportation and recreation, this is a bigger concern for women of every cyclist type than men. The most logical explanation for this is that many women are transporting children and do not feel it is possible to do so by bicycle in Toronto. However, even then, the concern is a weak one and the mean for men in every cyclist type category is actually one of weak disagreement that this item is a concern.

Table 27

**Personal Cycling Concern "I need to carry passengers and/or heavy loads which is difficult by bicycle" by Cyclist Type & Sex (1=strongly disagree, 4=strongly agree)**

Cyclist Type	Male <i>n</i>	Mean	Female <i>n</i>	Mean	Total <i>n</i>	Mean
<i>Noncyclists</i>	13	1.77	30	2.27	43	2.12
<i>Transportation cyclists</i>	9	1.67	11	2.0	20	1.85
<i>Recreational cyclists</i>	9	1.56	16	2.56	25	2.2
<i>Both transportation and recreational cyclists</i>	53	1.87	33	1.67	88	1.8
<b>Total</b>	<b>86</b>	<b>1.8</b>	<b>90</b>	<b>2.07</b>	<b>176</b>	<b>1.94</b>

The second item of interest (Table 28) is the concern that ranked the highest by men which is having no friends or family who cycle. This is somewhat surprising given the fact that more men than women cycle so one would expect that especially the male respondents would have same-sex friends who cycle. One possible explanation is that most respondents were heterosexual and that their answers are providing information about whether their *partners* are cyclists or not. If so this could be yet further evidence that women cycle less than men. The only category in which the mean for women was higher than for men was amongst the non-cyclists. It is difficult to know how to interpret this finding but it could indicate that women are more unlikely than men to cycle unless they have

same-sex friends that are cyclists. However it is impossible to know with any certainty why the sex differences exist in the responses to this statement but it seems worth remarking upon, as it was the highest ranked personal concern item for men. However, again, the overall mean for both men and women actually indicates weak disagreement that this item is a concern.

Table 28

Personal Cycling Concern "None of my close friends and/or family members cycle" by Cyclist Type & Sex (1=strongly disagree, 4=strongly agree)

Cyclist Type	Male <i>n</i>	Mean	Female <i>n</i>	Mean	Total <i>n</i>	Mean
<i>Noncyclists</i>	11	2.18	22	2.36	33	2.3
<i>Transportation cyclists</i>	8	1.88	10	1.8	18	1.83
<i>Recreational cyclists</i>	8	2.5	11	2.0	19	2.21
<i>Both transportation and recreational cyclists</i>	56	1.71	31	1.29	87	1.56
<b>Total</b>	<b>83</b>	<b>1.87</b>	<b>74</b>	<b>1.78</b>	<b>157</b>	<b>1.83</b>

The last personal concern item (Table 29) to be noted is the matter of cycling impacting on one's appearance. This is of interest only because some authors (eg Aultman-Hall & Hall, 1998) have theorized that it could explain why fewer women cycle. The overall mean for women is higher than it is for men but when this is broken down by category the average score for women is actually lower than the men's for almost every cyclist type. The only category in which women score higher than men are those who cycle for both transportation and recreation which seems to be more likely a result of men in that category scoring this concern much lower than the rest. For each type and both sexes, however, appearance is of very minimal concern. Concern over one's appearance, then, is inadequate to explain why these female respondents are cycling less.

Table 29

Personal Cycling Concern "My appearance is important and it's hard for cyclists to look nice" by Cyclist Type & Sex (1=strongly disagree, 4=strongly agree)

Cyclist Type	Male <i>n</i>	Mean	Female <i>n</i>	Mean	Total <i>n</i>	Mean
<i>Noncyclists</i>	14	1.57	30	1.5	44	1.52
<i>Transportation cyclists</i>	9	1.89	11	1.73	20	1.8
<i>Recreational cyclists</i>	9	1.79	16	1.75	25	1.76
<i>Both transportation and recreational cyclists</i>	53	1.3	32	1.59	85	1.41
<b>Total</b>	<b>85</b>	<b>1.46</b>	<b>89</b>	<b>1.61</b>	<b>174</b>	<b>1.53</b>

### Environmental (social) Concerns

All respondents had more social concerns than personal concerns and female respondents more so than men did. However this relationship was not statistically significant. In contrast to the personal concerns items, there was stronger agreement with the statements in this category being of concern to the respondents. As Table 30 shows, when broken down into cyclist type, the most significant differences were found between male and female non-cyclists. The mean for women was higher for each cyclist type, but only slightly higher. The one exception to this was in the non-cycling category in which women expressed much greater social cycling concerns than did their male counterparts.

Table 30

Social Cycling Concerns by Cyclist Type & Sex (1=strongly disagree, 4=strongly agree)

Cyclist Type	Male <i>n</i>	Mean	Female <i>n</i>	Mean	Total <i>n</i>	Mean
<i>Noncyclists</i>	14	2.38	30	2.71	44	2.6
<i>Transportation cyclists</i>	9	2.33	11	2.36	20	2.35
<i>Recreational cyclists</i>	9	2.3	16	2.4	25	2.36
<i>Both transportation and recreational cyclists</i>	56	2.31	33	2.38	89	2.33
<b>Total</b>	<b>88</b>	<b>2.32</b>	<b>90</b>	<b>2.49</b>	<b>178</b>	<b>2.41</b>

It is difficult to know how to interpret these data although the statement that had the most resonance with the respondents could provide some clues. This was the item that determined that the volume and speed of motor vehicle traffic impacts negatively upon all cyclist types. As Table 31 shows, with the exception of recreational cyclists, women more than men were in agreement that reducing the amount and speed of motor vehicle traffic would improve cycling in Toronto. This is an interesting result because it confirms what some (eg Parker, 2000) have surmized (ie that women cyclists are more sensitive to motor vehicle traffic than men are.) We are still no closer to understanding why this might be but this survey does partially confirm that this could be the case.

Table 31

Social Cycling Concern "Reducing the amount and speed of motor vehicle traffic would improve cycling in Toronto" by Cyclist Type & Sex (1=strongly disagree, 4=strongly agree)

Cyclist Type	Male <i>n</i>	Mean	Female <i>n</i>	Mean	Total <i>n</i>	Mean
<i>Noncyclists</i>	13	2.77	29	3.21	42	3.07
<i>Transportation cyclists</i>	8	2.5	11	3.0	19	2.79
<i>Recreational cyclists</i>	9	3.33	16	2.88	25	3.04
<i>Both transportation and recreational cyclists</i>	55	3.13	32	3.34	87	3.21
<b>Total</b>	<b>85</b>	<b>3.04</b>	<b>88</b>	<b>3.17</b>	<b>173</b>	<b>3.1</b>

Table 32 further confirms the finding that women tend to be more affected by motor vehicle traffic than men, even those who are already cyclists. Those respondents who were cyclists were asked to indicate which cycling facilities they felt comfortable riding on, a question asked originally of Decima (2000) survey respondents. The Decima survey found that "among cyclists who are comfortable cycling on major roads without bike lanes, seven in ten (70%) are men..." (Decima, 2000: 18). This study has replicated that finding. Only 53 (40%) of the 133 cyclists were comfortable cycling on that type of facility and 68% of those were men. Amongst those who are *not* comfortable riding on major roads with no bike lanes, Table 32 shows that there are also significant sex differences between cyclists. Although a similar majority of male and female transportational cyclists were not comfortable on these streets, the sex differences were quite marked for those who ride for recreation or those who ride for both recreation and transportation. The only group in which a slight majority actually felt more comfortable on these roads than uncomfortable were male cyclists who ride for both recreation and transportation. Traffic engineers may want to do further research to determine why it is that women are less comfortable than men are on these roads. On the other hand, given that the majority (both women *and* men) of cyclists would rather not ride on roads with no bicycle facilities, simply moving ahead with the building of more bike lanes and paths does seem warranted.

Table 32

Respondents *not* Comfortable Cycling on Major Roads without Bicycle Lanes by Cyclist Type & Sex

Cyclist Type	Male <i>n</i>	%	Female <i>n</i>	%	Total <i>n</i>	%
<i>Transportation cyclists</i>	5	63%	7	64%	12	63%
<i>Recreational cyclists</i>	6	67%	15	94%	21	84%
<i>Both transportation and recreational cyclists</i>	27	47%	20	63%	47	53%
<b>Total</b>	<b>38</b>	<b>51%</b>	<b>42</b>	<b>71%</b>	<b>80</b>	<b>60%</b>

2. Visible Minority Status, Immigrant Status & Willingness to Cycle

*[I would cycle more if I had] "...easier access to off-road trails for leisure riding."* (38 yr-old white male professional, born in the U.K., would like to cycle more, comfortable cycling on any type of road for both recreation and transportation, uses a bicycle as his primary mode of transportation: ID48)

*"I don't bike only because there are hardly any [bicycle] lanes in the downtown area and [I] have a fear of being hit by a car."* (25 yr-old visible minority female university student, born in Canada, would like to cycle but does not presently, uses a car as her primary mode of transportation: ID 145)

There exist quite marked differences in this survey between whites and visible minorities in terms of their attitudes toward cycling. The quotations above are but two examples of many which showed that white respondents are much more interested in cycling, especially utilitarian cycling, than visible minorities. 82% of the 136 white respondents were cyclists and only 51% of the 39 considered visible minorities cycled. Of the 113 respondents who provided their visible minority status who would

like to cycle or cycle more, 19 were visible minorities (49% of all visible minorities surveyed) and 94 (69% of all white respondents) were not. The relationship between willingness to cycle and visible minority status is a significant one, ( $r=-.1707$ ,  $n=173$ ,  $p<.05$ ) revealing that whites more than visible minorities are interested in cycling. This is another unexpected result as those who are cycling currently in Toronto are primarily white and it was predicted that visible minorities would like to cycle more than they do presently but are being held back by the current environment which requires a fairly high comfort level with engaging in a transportation choice that stands outside the norm.

Although the numbers are very small and thus it is difficult to determine whether the data provide us with trend information to extrapolate, the breakdown by cyclist type (Table 33) does reveal some interesting differences. It is the visible minority transportation cyclists and non-cyclists who indicated such a dramatically lesser interest in cycling than white respondents did. For the other two categories in which recreational cycling is an aspect, the visible minority respondents demonstrated similarly high levels of interest in cycling than their white counterparts did. There is virtually no literature exploring why it is predominantly whites in North America who voluntarily cycle (as opposed to those who cycle out of fiscal necessity). These data seem to indicate that visible minorities have little desire to cycle for transportation but do express considerable interest in participating in recreational cycling.

Table 33

Willingness to Cycle/Cycle More by Cyclist Type & Visible Minority Status

Cyclist Type	White <i>n</i>	%	Visible Minority <i>n</i>	%	Total <i>n</i>	%
<i>Noncyclists</i>	16	67%	6	33%	22	51%
<i>Transportation cyclists</i>	9	64%	3	50%	12	60%
<i>Recreational cyclists</i>	15	75%	3	75%	18	75%
<i>Both transportation and recreational cyclists</i>	54	70%	7	70%	61	69%
<b>Total</b>	<b>94</b>	<b>69%</b>	<b>19</b>	<b>49%</b>	<b>113</b>	<b>65%</b>

The overall question remains however. Why were the visible minorities in this sample less interested in cycling than were white respondents? One possible contributing factor to be explored is whether or not a relationship exists between visible minority status and immigrant status. If a large proportion of the visible minorities in this sample are also new immigrants, this factor, rather than the visible minority factor, could better explain the effect. This is due to the belief that new immigrants differ from more established Canadians in that they place a higher priority on fitting into their new society and are less critical of the government of their new home country. As cyclists are clearly not regarded as an important aspect of traffic here in Toronto, new immigrants may be reluctant to participate in this somewhat marginalized activity. However as can be seen in Table 34, there are no differences in terms of willingness to cycle between those visible minorities who were born in Canada and those who were not. So, surprisingly, this seems to show that regardless of whether or not visible

minorities in this sample were born outside of Canada or within, they are much less interested in cycling thus negating the new immigrant factor as a possible explanation for why fewer visible minorities are cycling here.

Table 34

Willingness to Cycle/Cycle More by Visible Minority & Immigrant Status

Visible Minority & Immigrant Status	Yes	%	No	%	Total	%
<i>White, born in Canada</i>	75	69%	34	31%	109	63%
<i>White, not born in Canada</i>	19	73%	7	27%	26	15%
<i>Visible minority, born in Canada</i>	8	50%	8	50%	16	9%
<i>Visible minority, not born in Canada</i>	11	50%	11	50%	22	13%
<b>Total</b>	<b>113</b>	<b>65%</b>	<b>60</b>	<b>35%</b>	<b>173</b>	<b>100%</b>

Another avenue to explore in relation to new immigrants attitudes toward cycling is that of whether or not they have come to Canada from a country considered "bicycle friendly", that is where there are social supports in place for cycling and a greater percentage of the population cycles than they do here. This could also possibly explain why such a large majority of the white respondents born outside of Canada expressed a willingness to cycle. However, examining the country of origin does not reveal anything that looks like a pattern but it is a testament to the spectacularly diverse range of countries of origin that Toronto's new immigrants represent.

None of the visible minorities, whether they were interested in cycling or not, came from Germany or Holland, two of the "bicycling friendly" countries represented in this survey. The 11 visible minorities not born in Canada who expressed a willingness to cycle were from the following countries: three from England or Ireland, and one each from Africa, Argentina, Kenya, Korea, Nigeria, South Africa, Venezuela & Vietnam. The 11 visible minorities not born in Canada and not interested in cycling were from the following countries: two from Hong Kong, two from India, two from Sri Lanka, and one each from the Caribbean, Ghana, Iran, Philippines & Suriname. Turning to the white respondents we see that, unlike the visible minority respondents, some of them are from "bicycle friendly" countries. However, it is not clear that this impacted one way or another on their willingness to cycle in Canada. The 7 white respondents not born in Canada who expressed a willingness to cycle were from the following countries, 3 of which are considered "cycling friendly": two from England & Ireland, three from Germany, and one each from France & the U.S.A. The 19 white respondents not born in Canada who expressed no interest in cycling/cycling more were from the following countries, 2 of which are considered "cycling friendly": four from England & Ireland, two from Poland, six from the U.S.A., and one each from Ethiopia, Germany, Holland, Iran, Portugal and Romania.

So despite the fact that theories about new immigrants and cycling seem plausible, they are not born out in these data. Looking at the particular concerns visible minorities expressed may be a better avenue to explore.

### Personal Concerns

As expected, visible minorities had more concerns than white respondents regarding cycling and the correlation coefficient ( $r=-.2335$ ,  $n=174$ ,  $p<.01$ ) shows that visible minorities have significantly more personal concerns than whites. By breaking this down into cyclist type, Table 35 shows that it is transportation cyclists in particular whose mean score is higher than white cyclists. This could very well indicate that the visible minorities who are riding for transportation are not doing so willingly but because they have no transportation choice. Conversely, those visible minorities who cycle recreationally actually had a lower average personal concern score than did white recreational cyclists. It is important to keep in mind that personal concerns were ranked quite low for all respondents. It is only a score above 2.0 which indicates that the respondent is in agreement with these concerns relating to them.

Table 35

Personal Cycling Concerns by Cyclist Type & Visible Minority Status (1=strongly disagree, 4=strongly agree)

Cyclist Type	White <i>n</i>	Mean	Visible Minority <i>n</i>	Mean	Total <i>n</i>	Mean
<i>Noncyclists</i>	24	2.11	19	2.15	43	2.12
<i>Transportation cyclists</i>	14	1.51	6	2.17	20	1.71
<i>Recreational cyclists</i>	20	1.89	4	1.63	24	1.84
<i>Both transportation and recreational cyclists</i>	77	1.43	10	1.49	87	1.44
Total	135	1.63	39	1.93	174	1.69

The breakdown by cyclist type for each of the six statements that comprise the personal concerns score is not markedly different from the combined table in Table 35. Only the statement that was the number one concern for both white respondents and visible minorities will be elaborated. (Table 36) This is the same concern that ranked first for women: the transport of passengers or other heavy loads. By looking at the cyclist types, though, it can be seen that this is a considerable concern for visible minorities who are not cyclists or who cycle for transportation only. As these are the same groups who are unwilling to cycle, this concern could explain their disinterest. Visible minorities who ride for recreation indicated that passengers and/or heavy loads are of lesser concern to them than they are for white respondents.

Table 36

**Personal Cycling Concern "I need to carry passengers and/or heavy loads which is difficult by bicycle" by Cyclist Type & Visible Minority Status (1=strongly disagree, 4=strongly agree)**

Cyclist Type	White <i>n</i>	Mean	Visible Minority <i>n</i>	Mean	Total <i>n</i>	Mean
<i>Noncyclists</i>	24	1.92	18	2.44	42	2.14
<i>Transportation cyclists</i>	14	1.64	6	2.33	20	1.85
<i>Recreational cyclists</i>	20	2.25	4	1.5	24	2.13
<i>Both transportation and recreational cyclists</i>	76	1.84	10	1.6	86	1.81
<b>Total</b>	<b>134</b>	<b>1.90</b>	<b>38</b>	<b>2.11</b>	<b>172</b>	<b>1.94</b>

### **Environmental (social) Concerns**

Overall, visible minorities had greater social cycling concerns than personal and the correlation coefficient ( $r=-.1935$ ,  $n=174$ ,  $p<.05$ ) shows that they also have significantly more social cycling concerns than do their white counterparts. Once again though, as Table 37 shows, the concerns are the greatest for visible minority non-cyclists and transportation cyclists whereas those visible minorities who ride recreationally have fewer concerns than do white cyclists in the same categories.

Table 37

**Social Cycling Concerns by Cyclist Type & Visible Minority Status (1=strongly disagree, 4=strongly agree)**

Cyclist Type	White <i>n</i>	Mean	Visible Minority <i>n</i>	Mean	Total <i>n</i>	Mean
<i>Noncyclists</i>	24	2.41	19	2.81	43	2.59
<i>Transportation cyclists</i>	14	2.12	6	2.89	20	2.35
<i>Recreational cyclists</i>	20	2.38	4	2.25	24	2.36
<i>Both transportation and recreational cyclists</i>	77	2.35	10	2.3	87	2.34
<b>Total</b>	<b>135</b>	<b>2.34</b>	<b>39</b>	<b>2.63</b>	<b>174</b>	<b>2.41</b>

The breakdown by cyclist type for each of the three statements that comprise the social concerns score is of some interest. Although the number one social concern for visible minorities was the same as it was for all others: motor vehicle volume and speed, the mean score for visible minorities (3.05) was lower than the mean for whites (3.12). The other two statements were of greater concern to visible minorities than to whites, those regarding weather and distance, especially the latter as demonstrated in Table 38. Once again, as with personal and social concerns more generally, the greater concern regarding distance was expressed by visible minority non-cyclists and transportation cyclists. The fact that visible minority respondents live too far from most places they need to go to cycle there makes sense based on settlement patterns in Toronto. Unlike U.S. cities and their suburbs, Toronto's downtown core "has a slightly lower immigrant and visible minority

population than its suburbs." (Smith Lea, 2000: 55) And most people, even those of average fitness, find the distance prohibitive for cycling between Toronto's suburbs and the downtown universities.

Table 38

Social Cycling Concern "I live too far from most places I need to go to bike there" by Cyclist Type & Visible Minority Status (1=strongly disagree, 4=strongly agree)

Cyclist Type	White <i>n</i>	Mean	Visible Minority <i>n</i>	Mean	Total <i>n</i>	Mean
<i>Noncyclists</i>	24	1.92	19	2.89	43	2.35
<i>Transportation cyclists</i>	14	1.5	6	2.83	20	1.9
<i>Recreational cyclists</i>	20	1.95	4	1.5	24	1.88
<i>Both transportation and recreational cyclists</i>	75	1.63	10	1.7	85	1.64
<b>Total</b>	<b>133</b>	<b>1.71</b>	<b>39</b>	<b>2.44</b>	<b>172</b>	<b>1.88</b>

Even though distance was of greater concern to visible minorities than to whites, cycling in close proximity to motor vehicles was even more of a deterrent. As Table 39 indicates, visible minority respondents were more affected by lack of bicycle facilities on major roads than were whites. There were also considerable differences between types of cyclists. A significantly higher percentage of visible minority cyclists than white cyclists who ride for transportation or for both transportation and recreation indicated they were not comfortable riding on major streets without bike lanes. A smaller percentage of visible minorities than whites who ride for recreation only expressed discomfort under these conditions but the sample size in this category is extremely small. It is not clear why these cyclists feel the way they do on major streets, but the fact that they do is important.

Table 39

Respondents *not* Comfortable Cycling on Major Roads without Bicycle Lanes by Cyclist Type & Visible Minority Status

Cyclist Type	White <i>n</i>	Mean	Visible Minority <i>n</i>	Mean	Total <i>n</i>	Mean
<i>Transportation cyclists</i>	7	50%	5	83%	12	60%
<i>Recreational cyclists</i>	18	90%	2	50%	20	83%
<i>Both transportation and recreational cyclists</i>	37	78%	9	90%	46	52%
<b>Total</b>	<b>62</b>	<b>55%</b>	<b>16</b>	<b>80%</b>	<b>78</b>	<b>59%</b>

### **3. Age & Willingness to Cycle**

**"Motorists are too ignorant of road safety, it [cycling] is good exercise, but why die for it?" (24 yr-old white male university student, born in Canada, would like to cycle more, presently cycles on bike paths and minor roads only, uses a car as his primary mode of transportation: ID108)**

**[I would cycle more if I had] "...a less busy lifestyle." (52 yr-old white male academic, born in Canada, would like to cycle more, comfortable cycling on any type of road for both recreation and transportation, uses a car as his primary mode of transportation: ID48)**

Comparative studies of cities with high rates of cycling, both of European (e.g. Pucher, Evans & Wenger, 1998) and North American countries (e.g. Federal Highway Administration, 1993) show that cities with universities have high levels of bicycle commuting. As the bicycle is an inexpensive form of transportation, it seems reasonable to expect that young college students would travel this way. And indeed a recent large-scale cycling study found that, of 388,000 utilitarian cyclists over age 15 in Toronto, 63,000 (or 16% of utilitarian cyclists) ride to school. (Decima, 2000: 10) It was this that made the two primary sample groups, both from university campuses, of particular interest yet this survey found that the majority of the student respondents do not cycle to school. Of the 96 students surveyed, only 39 (41%) cycle to school. However we cannot assume that these students are necessarily young and indeed when age is considered we find some interesting results.

93 of the 96 students provided their age. Of the 63 students aged 18-25, 22 or only 35% cycle to school--so only one third of the younger students are cycling. A different picture emerges by looking at the 31 students 26 years of age and older. Of these, a little over half (16 or 52%) cycle to school. As most North American research (eg. FHA, 1993) has found that bicycling, especially for transportation, becomes less popular as one ages, why is it that younger students are less likely to cycle to school than older students in Toronto? Although there were no clear-cut distinctions, a greater majority of the older respondents were cyclists whereas many of the younger survey respondents seemed to disregard cycling out of hand due to fear of motor vehicle traffic as voiced by the young student above. Nevertheless, regardless of whether the respondents were young or old, the majority identified themselves as cyclists. Of the 173 respondents who divulged their age group, 67% of the 79 respondents in the 18-25 age group were cyclists, 86% of the 28 respondents in the 26-30 age group were cyclists, 89% of the 35 respondents in the 31-40 age group were cyclists and 77% of the 31 respondents age 41 and over were cyclists.

Older respondents were also more likely to express a greater desire to engage in cycling, especially for recreation, but experience difficulty in fitting it in to their current schedule. Of the 114 respondents who would like to cycle or cycle more than they do presently and who revealed their age, 48 are age 18-25 (62% of all respondents in this category), 14 are age 26-30 (50%), 27 are age 31-40 (75%) and 25 are age 41 and over (81%). The correlation coefficient for willingness to cycle and age is significant ( $r=.1600$ ,  $n=172$ ,  $p<.05$ ) which, as seen in Table 40, means that older respondents, more than younger, were more likely to respond positively to this question. However, despite the fact that a greater percentage of older respondents were more interested in cycling than younger (with the exception of those who ride for transportation only), interest in cycling was still professed by a majority of those in the 18-25 age category as well. This was an expected result.

Table 40

Willingness to Cycle/Cycle More by Cyclist Type & Age

Cyclist Type	Age 18-25 n	%	Age 26+ n	%	Total n	%
<i>Noncyclists</i>	13	50%	9	56%	22	52%
<i>Transportation cyclists</i>	8	73%	4	44%	12	55%
<i>Recreational cyclists</i>	9	75%	9	75%	18	75%
<i>Both transportation and recreational cyclists</i>	18	60%	43	75%	61	69%
<b>Total</b>	<b>45</b>	<b>59%</b>	<b>65</b>	<b>69%</b>	<b>113</b>	<b>65%</b>

In an effort to explain why younger respondents overall expressed less interest in cycling, an examination into their attitudes toward helmet use was explored. The mandatory helmet law for cyclists under age 18, in effect in Ontario since 1995, may act as a deterrent to cycling as it has elsewhere. Australia's cycle helmet law came into effect in 1990 and research from this country increasingly suggests that the reduction in the number of reported head injuries is not, as expected, due to helmet use but to a reduction in bicycle use. (Robinson, 1996; Cameron et al, 1994) Many of the current university students would have been teenagers when Ontario's helmet law came into effect and thus affected by it. The Ministry of Transportation has done no follow-up study on the helmet law but where such studies have been conducted elsewhere, they have revealed that helmet laws have limited effectiveness. Given this, the hypothesis was that those interested in cycling would be against mandating helmet use. Interestingly, however, the respondents in this data set responded decisively in favour, not only of the current law, but to expanding this law so that cyclists of all ages would be mandated to wear a helmet. Little difference was found between those who are willing to cycle and those who are not in terms of their support for mandatory helmet use. However, as Table 41 shows, those who already cycle were less likely to support the current under age 18 helmet law than were non-cyclists. Also, as expected, younger cyclists overall were found to be less in favour of this law than those who were older.

Table 41

Respondents in Favour of Current Helmet Law Requiring all Cyclists under age 18 to Wear a Helmet by Cyclist Type & Age

Cyclist Type	Age 18-25 n	%	Age 26+ n	%	Total n	%
<i>Noncyclists</i>	24	96%	14	88%	38	93%
<i>Transportation cyclists</i>	6	55%	9	100%	15	75%
<i>Recreational cyclists</i>	9	75%	12	100%	21	88%
<i>Both transportation and recreational cyclists</i>	21	70%	43	74%	64	73%
<b>Total</b>	<b>47</b>	<b>77%</b>	<b>78</b>	<b>82%</b>	<b>113</b>	<b>65%</b>

Another survey question asked respondents to describe their attitudes toward a mandatory helmet law for *all* cyclists. Although there was weaker agreement for such a law than there is support for the current law, overall there was considerably high agreement that such a law should be enacted. However Table 42 shows that younger respondents were much less likely to agree that such a law is necessary as were those who cycle for transportation. With the exception of older recreational cyclists, it was non-cyclists, regardless of age, who demonstrated the greatest support for such a law.

Table 42

Support for Personal Cycling Improvement "There should be a law requiring cyclists of all ages to wear a bicycle helmet " by Cyclist Type & Age (1=strongly disagree, 4=strongly agree)

Cyclist Type	Age 18-25 n	%	Age 26+ n	%	Total n	%
<i>Noncyclists</i>	26	3.38	16	3.44	42	3.40
<i>Transportation cyclists</i>	11	2.09	9	3.0	20	2.5
<i>Recreational cyclists</i>	12	2.58	12	3.83	24	3.21
<i>Both transportation and recreational cyclists</i>	30	2.2	56	2.54	86	2.42
<b>Total</b>	<b>79</b>	<b>2.63</b>	<b>93</b>	<b>2.9</b>	<b>172</b>	<b>2.78</b>

As a cyclist opposed to mandatory helmet laws, it was discouraging to see the results of this survey. However, it is unlikely that most of the respondents know much, if anything, about the debates surrounding helmets. Helmets are typically seen by non-cyclists as a safety device that responsible cyclists will use. Those who ride for transportation are much more likely to be aware of the controversies and have taken a stand one way or the other. Another possibility is that, as the transportation cyclists are the respondents who actually have first-hand experience of cycling on the streets of Toronto, cycling is not perceived as such a scary activity as it seems from those who are not engaging in it. This supports arguments made by Forester and others that as cycling skill increases, confidence levels also increase and the need for special conditions decreases.

However the fact that those who are not engaged in cycling perceive it to be a dangerous activity requiring a helmet is a significant deterrent. In places where cycling use is high, helmet use is correspondingly low, such as in the Netherlands. It is almost as if the rate of helmet use in any given location is actually an indication of the level of fear people have regarding cycling. By contrast, in most cities where helmet use is high, cycling is also low. So if helmet use is high it seems to be an indication that cyclists feel threatened on the roads. If helmet use is low the cycling environment is typically much more relaxed. However, even before the helmet law was introduced in Ontario the percentage of the population that cycled for transportation was low, despite a latent desire to do so, especially in Toronto. (Hunt, 1992). This may be explained by the fact that concerns regarding lack of safe conditions come up time and again as one of the greatest barriers to cycling. (eg. Federal

Highway Administration, 1993) The respondents' concerns are thus a better indication of what may be impacting on their willingness to cycle.

### Personal Concerns

As the older respondents in this survey were more likely to be cyclists and to be interested in cycling we might expect that the older respondents had fewer concerns about cycling than did the young. Indeed, the correlation coefficient determined that there was a significant relationship between age and personal concerns ( $r=-.1916$ ,  $n=173$ ,  $p<.05$ ) with the younger respondents indicating more concern than the older. By breaking this down into cyclist type, Table 43 shows that older non-cyclists indicated more personal concern than did younger non-cyclists but younger cyclists of all types expressed greater concern. Once again it is important to note that personal concerns were ranked quite low for all respondents. It was the non-cyclists only whose mean score indicates actual agreement with these concerns relating to them.

Table 43

Personal Cycling Concerns by Cyclist Type & Age (1=strongly disagree, 4=strongly agree)

Cyclist Type	Age 18-25 n	%	Age 26+ n	%	Total n	%
<i>Noncyclists</i>	26	2.07	16	2.13	42	2.09
<i>Transportation cyclists</i>	11	1.87	9	1.5	20	1.71
<i>Recreational cyclists</i>	12	1.97	12	1.79	24	1.88
<i>Both transportation and recreational cyclists</i>	30	1.56	57	1.38	87	1.44
<b>Total</b>	<b>79</b>	<b>1.83</b>	<b>94</b>	<b>1.57</b>	<b>173</b>	<b>1.69</b>

For each of the six statements that comprise the personal concerns score the mean for the younger respondents was higher than it was for those who were older. This is perhaps not too meaningful as most of the mean scores for both young and old respondents indicated only weak agreement that these concerns related to them. Nevertheless it is odd that the number one concern for younger respondents was carrying passengers and/or heavy loads. One would expect that it would be those respondents *over* age 26 who have childcare responsibilities so this may indicate a need to carry heavy loads or passengers other than children. (There was a tie for top primary personal concern for older respondents between passengers and having no close friends who cycle.) Furthermore, as Table 44 shows, the mean score for every cyclist type was higher for younger respondents than it was for older. However the respondents did need to agree with the other aspect of this statement which is that it is difficult to transport such loads by bicycle. It could be that the older respondents have greater stamina but this would be an unexpected finding. Perhaps more plausibly the older respondents have discovered the many ways in which it is manageable to transport heavy loads by bicycle. This would make more sense given that it is the younger non-cyclists and

recreational cyclists who expressed this as their greatest concern and they would be less likely to have experience than older cyclists and transportation cyclists of either age group in this regard.

Table 44

Personal Cycling Concern "I need to carry passengers and/or heavy loads which is difficult by bicycle" by Cyclist Type & Age (1=strongly disagree, 4=strongly agree)

Cyclist Type	Age 18-25 <i>n</i>	%	Age 26+ <i>n</i>	%	Total <i>n</i>	%
<i>Noncyclists</i>	26	2.31	16	1.88	42	2.14
<i>Transportation cyclists</i>	11	1.91	9	1.78	20	1.85
<i>Recreational cyclists</i>	12	2.42	12	1.83	24	2.13
<i>Both transportation and recreational cyclists</i>	30	2.07	56	1.68	86	1.81
Total	79	2.18	93	1.74	172	1.94

### Environmental (social) Concerns

Although younger respondents had greater social cycling concerns than personal, they had fewer of these concerns than did older respondents. However the relationship between age and social cycling concerns was not statistically significant. There were quite distinct differences expressed by the different cyclist types as shown in Table 45. It was the younger cyclists who had much fewer social concerns than did the older cyclists but the younger noncyclists indicated greater concerns than did the older noncyclists.

Table 45

Social Cycling Concerns by Cyclist Type & Age (1=strongly disagree, 4=strongly agree)

Cyclist Type	Age 18-25 <i>n</i>	%	Age 26+ <i>n</i>	%	Total <i>n</i>	%
<i>Noncyclists</i>	26	2.68	16	2.46	42	2.6
<i>Transportation cyclists</i>	11	2.09	9	2.67	20	2.35
<i>Recreational cyclists</i>	12	2.22	12	2.44	24	2.33
<i>Both transportation and recreational cyclists</i>	30	2.3	57	2.35	87	2.33
Total	79	2.38	94	2.41	173	2.4

Two of the statements that comprise the social concerns score are of interest. The first is the reaction expressed by younger and older respondents to the issue of motor vehicle traffic. As can be seen in Table 46, if younger respondents were cyclists they were much less likely to believe that reducing the amount and speed of motor vehicle traffic was important than were older respondents. The opposite was true if they were non-cyclists. If this finding signifies a more general trend it could go a long way to explaining why it is that, generally speaking, young North Americans cycle more than older citizens do. However it does not shed any light on why older students in this survey rode

to school more than younger students given that it is the latter that expressed less concern about the motor vehicle traffic in Toronto.

Table 46

**Social Cycling Concern "Reducing the amount and speed of motor vehicle traffic would improve cycling in Toronto" by Cyclist Type & Age (1=strongly disagree, 4=strongly agree)**

Cyclist Type	Age 18-25 n	%	Age 26+ n	%	Total n	%
<i>Noncyclists</i>	26	3.15	16	2.94	42	3.07
<i>Transportation cyclists</i>	11	2.27	8	3.5	19	2.79
<i>Recreational cyclists</i>	12	2.83	12	3.17	24	3.0
<i>Both transportation and recreational cyclists</i>	28	3.04	57	3.28	85	3.2
<b>Total</b>	<b>77</b>	<b>2.94</b>	<b>93</b>	<b>3.23</b>	<b>170</b>	<b>3.09</b>

This brings us to the second statement of interest in the social concerns category which requested information about whether respondents live within cycling distance of where they need to go. Most bicycle usage studies have found that trip distance as a function of the North American sprawling urban form is one of the main structural disincentives to cycling. This typically follows closely behind concerns about traffic safety that is most often the primary impediment to cycling expressed by survey respondents. Although there are individual factors involved in how far one may wish or is able to cycle, most research has found that a typical bicycle trip is no longer than about 2 miles, although bicycle commute trips may be longer. (FHA, 1993: 7) However Forester's estimate of a reasonable one-way bicycle commute trip is quite a bit higher than others at 4.7 miles. (Forester, 1993: 384)

Little is known about whether a relationship exists between distance and age however, and as shown in Table 47, younger respondents of every cyclist type indicated that this was of greater concern to them than it was for older respondents. The most reasonable interpretation of this finding is to take it at face value: that the younger respondents live further from most places they need to go than older respondents do. However we run into the same problem as with the heavy loads statement and that is that respondents need to agree with the other aspect of this statement as well which is that it is too difficult to cycle long distances. It could be that the older respondents have found through experience that cycling long distances is not onerous. Individual variations aside though, the more plausible explanation is backed up by other research: that there is a well established link between the distance one needs to travel and the likelihood of making that trip by bicycle. Why younger respondents would have greater distances to travel than older respondents is not known.

Table 47

**Social Cycling Concern "I live too far from most places I need to go to bike there" by Cyclist Type & Age (1=strongly disagree, 4=strongly agree)**

Cyclist Type	Age 18-25 <i>n</i>	%	Age 26+ <i>n</i>	%	Total <i>n</i>	%
<i>Noncyclists</i>	26	2.42	16	2.0	42	2.26
<i>Transportation cyclists</i>	11	1.91	9	1.89	20	1.9
<i>Recreational cyclists</i>	12	2.0	12	1.75	24	1.88
<i>Both transportation and recreational cyclists</i>	29	1.79	56	1.55	85	1.64
<b>Total</b>	<b>78</b>	<b>2.05</b>	<b>93</b>	<b>1.67</b>	<b>171</b>	<b>1.85</b>

Finally, a look at whether cyclists feel comfortable cycling on major roads without bike lanes in Table 48 reveals that a greater majority of the younger cyclists than older cyclists are less comfortable riding in close proximity to motor vehicles. This finding seems to contradict that found in Table 46 above—that younger cyclists were less likely than older cyclists to believe that reducing motor vehicle traffic and speed would be an improvement to cycling. However this could well indicate that younger cyclists believe that their discomfort in traffic is a personal failing rather than a systemic problem and that the onus is on them to increase their confidence about riding in traffic, rather than considering a mediation of the problem itself (motor vehicle traffic).

Table 48

**Respondents *not* Comfortable Cycling on Major Roads without Bicycle Lanes by Cyclist Type & Age**

Cyclist Type	Age 18-25 <i>n</i>	%	Age 26+ <i>n</i>	%	Total <i>n</i>	%
<i>Transportation cyclists</i>	8	73%	4	44%	12	60%
<i>Recreational cyclists</i>	10	83%	10	83%	20	83%
<i>Both transportation and recreational cyclists</i>	20	67%	26	45%	46	52%
<b>Total</b>	<b>38</b>	<b>72%</b>	<b>40</b>	<b>52%</b>	<b>78</b>	<b>59%</b>

### **Conclusion**

Several studies (eg Moritz, 1998) have found that the majority of North American cyclists are older white males. Thus it was expected that those who are women, younger and considered visible minorities would have the greatest concerns about cycling safety but would also possess a latent desire to cycle. It was also believed that concerns of a systemic nature would be greater impediments to cycling than those of an individual nature, especially for those who are not already cycling. The findings for each concern type and the characteristics of those who are willing to cycle at all or cycle more than they do presently will be briefly summarized for the different groups of interest.

## 1. Sex Differences

The majority (75%) of the respondents were cyclists. Of these, 84% of male respondents were cyclists and 67% of female respondents were cyclists. Of the non-cyclists, 67% were women. The majority (64%) of the respondents would like to cycle or cycle more than they do. Of these, 71% of male respondents would like to cycle/cycle more and 58% of female respondents would like to cycle/cycle more. Most of the women who do not already cycle are not interested in cycling. Thus the hypothesis that a latent desire to cycle exists amongst women was not confirmed.

The overall agreement regarding personal concerns about cycling was quite low but these concerns were higher for women than they were for men, especially for those women who were not cyclists or were recreational cyclists only. Thus the hypothesis that women would have greater personal cycling concerns than men was confirmed. The greatest personal concern for women was the need to transport passengers and/or heavy loads whereas the greatest personal concern for men was that they had no close friends or family who cycled. A concern about personal appearance, hypothesized elsewhere to be a possible deterrent keeping women from cycling, did not hold much relevance for this sample.

Overall the respondents were in greater agreement with statements about social cycling concerns than personal concerns. Both male and female respondents expressed relatively high social concern although the social concern expressed by women was higher than men's. This hypothesis was thus confirmed. The number one systemic concern for both men and women was the amount and volume of motor vehicle traffic. Only 40% of cyclists in this survey were comfortable cycling on major roads with no bike lanes and of those, 68% were men. Conversely, 51% of male cyclists and 71% of female cyclists were *not* comfortable riding on these major arterials.

## 2. Visible Minority Status.

82% of the white respondents cycle whereas only 51% of those considered visible minorities do. The majority (69%) of whites would like to cycle or cycle more than they do whereas less than half (49%) of visible minorities would. Thus, the hypothesis that a latent desire to cycle exists amongst visible minorities was not confirmed. No distinct differences were found between visible minorities who were born in Canada and those who were not in terms of whether or not they presently cycle or are interested in cycling. Immigrants who were white were more likely to demonstrate interest in cycling than those who were visible minorities, regardless of whether or not they emigrated from a "bicycle-friendly" country.

The white respondents had fewer personal concerns than did the visible minority respondents, thus this hypothesis was confirmed. The number one personal concern for both whites and visible minorities was the need to transport heavy loads or passengers. The personal concerns expressed by visible minorities who were non-cyclists or transportation cyclists were notably higher than other groups which could possibly explain their disinterest in cycling.

Visible minorities also had more social concerns overall than did white respondents. Looking at these concerns more carefully, it was determined that it was the visible minority respondents who were non-cyclists or who rode for transportation that had greater social concerns than whites whereas

white respondents who ride for transportation or for both transportation and recreation had slightly greater social concerns than did visible minority respondents. Thus the hypothesis that visible minorities would have greater social concerns is only partially confirmed. The number one social concern for both whites and visible minorities was motor vehicle traffic although this was of greater concern for whites. 80% of visible minority cyclists were not comfortable on major roads without bike lanes as compared to 55% of white cyclists. The second systemic concern of importance was trip distance and this was a greater concern for visible minorities than whites.

### 3. Age

Only 41% of the students in this survey were cyclists. Of the students aged 26 and over, 52% cycle to school whereas only 35% of those aged 18-25 do. Looking beyond students to the entire sample, 67% of those aged 18-25 cycle, 86% of those aged 26-30, 89% of those aged 31-40 and 77% of those 41 years of age and over. As far as willingness to cycle, 62% of those aged 18-25 are interested in cycling or cycling more, 50% of those aged 26-30, 75% of those aged 31-40 and 81% of those 41 years of age and over. Overall the younger respondents were not presently cyclists more than older respondents, nor were they more interested in cycling. Thus the hypothesis that a latent desire to cycle exists amongst younger respondents, despite low participation in cycling, was disconfirmed. An examination of attitudes toward helmet laws as a possible impediment to young cyclists found an overwhelming support for mandatory helmet laws, although this support was somewhat weaker amongst younger respondents. Non-cyclists, regardless of age expressed the strongest support.

The younger respondents who were cyclists expressed greater personal concerns than did the older cyclists whereas the older non-cyclists had greater concerns than the younger non-cyclists. Thus the hypothesis that younger respondents would have greater personal concerns was only partially confirmed. The number one personal concern for younger respondents was the need to transport heavy loads. For older respondents it was a tie between the heavy loads concern and that of having no close friends or family whom cycle.

Contrary to what was found with personal concerns, the younger respondents who were cyclists expressed lower social concerns than did the older cyclists whereas the younger non-cyclists had greater concerns than the older non-cyclists. Thus the hypothesis that younger respondents would have greater social concerns was only partially confirmed. The number one social concern for both younger and older respondents was motor vehicle traffic although this was of greater concern for those who were older. However although younger cyclists were less inclined to consider reducing motor vehicle traffic as a possibility, 72% of them were not comfortable riding on major roads without bike lanes, compared to 52% of older cyclists. The second systemic concern of importance was trip distance and this was a greater concern for those who were younger.

## **Conclusion and Proposals for Change**

This is arguably the most difficult part of the thesis—deciding on what were the most important or novel discoveries that were made. The goals for this study were broad, too much so perhaps. As research is only one of many ways in which urban cycling is neglected, the temptation was great to explore too many avenues at once and attempt to present solutions for the problems which abound for those who cycle within the city of Toronto. The result is a modest contribution only but one that will hopefully open up the dialogue of how the prevailing North American approach to cycling safety impacts unevenly on different populations.

### **Recap of Major Findings**

1. **Concerns of Different Populations.** This research confirms that some groups are not participating in cycling as much others (women less than men, visible minorities less than whites and young less than old), nor do they have a latent desire to cycle. Women, visible minorities and younger respondents also identified greater personal deterrents to cycling (eg the need to carry passengers) than the groups with which they were compared. Concerns of a more systemic nature (eg motor vehicle traffic) were also greater for women than men and visible minorities than whites but relatively high for both sexes and racial groupings. Older respondents attached more significance to social concerns than did those who were younger unless they were *non-cyclists* in which case younger respondents expressed greater concern than older. A much greater percentage of white, older, male cyclists were comfortable riding on major roads without bike lanes than were visible minorities, women and the youngest surveyed.

2. **Attitudes toward Individual and Social Responsibility Models.** Women and visible minorities, more than white men, supported taking personal measures to increase safety while cycling. However, support for this more individualistic approach to cycling safety was weak overall (only 55% in favour) for both sexes and racial groupings. The social responsibility model of cycling was supported much more strongly (76% overall support), but, unexpectedly, this backing was slightly lower for women and visible minorities than that expressed by white men. This was a surprising result because, as it is more often white men (eg Forester) who advocate for an individualistic approach to safety and it is they that have the least concerns with cycling in the current traffic environment, it would seem reasonable to expect the support amongst white men for the social responsibility model would be lower than for groups who indicate greater concern. These sex and visible minority status differences were reduced significantly when the cyclists were separated from the non-cyclists, however there is evidence that they still exist. Non-cyclists were more in favour of personal solutions to cycling safety than cyclists were.

The fact that respondents generally favoured *both* personal and social solutions for cycling safety is very likely related to their concerns associated with this activity. Other theories that were tested to determine what might be causing some to cycle less than others were not confirmed. One theory not supported in this data was the impact of cycling upon appearance that has been

hypothesized to be a deterrent to cycling especially for women. Also disconfirmed was the notion that visible minorities may be cycling less because of this group being over-represented by new immigrants trying to fit in within a car-oriented society. In fact there was no difference at all found between those visible minorities born in Canada and those who were not--both groups had considerably less interest in cycling than did white respondents, both immigrants or native-born Canadian.

3. The Impact of Political Beliefs on Attitudes toward Cycling. One of the most unexpected findings of this study was how political beliefs impacted upon attitudes toward cycling safety. Support for an individualistic model of cycling safety was fairly stable for right-wing voters regardless of whether or not they were cyclists. For left-wing voters, however, support for this model varied dramatically depending on whether or not they were cyclists. If they were cyclists they were solidly opposed to this approach whereas if they were non-cyclists they were much more likely to be in favour. Looking at the attitudes toward social improvements we find that regardless of political beliefs, the cyclists were similarly supportive of this model, as were the left-wing non-cyclists. The right-wing non-cyclists, on the other hand, were slightly opposed. Finally the difference between the right-wing and left-wing cyclists was quite marked in comfort level with the existing status quo. Both right-wing and left-wing non-cyclists expressed comparable weak disagreement that it is possible to cycle safely in the conditions as they are. Left-wing cyclists strongly disagreed whereas the average score for right-wing cyclists neared agreement with such a belief.

There were unremarkable differences between the sexes in this dataset in terms of political orientation. Nevertheless political beliefs do help to clarify the sex differences as it was female *right-wing* respondents only who supported more individualistic cycling improvements and they were also alone in their reluctance to support social responsibility measures. The voting patterns of visible minority and white respondents were quite pronounced. A much greater percentage of visible minorities than whites were right-wing voters which is a valuable clue to understanding why visible minority respondents were more likely to favour an individualistic approach to safety. Analysis controlling for political beliefs confirmed that it was visible minority *right-wing* respondents only who supported more individualistic cycling improvements and who indicated that the current traffic environment is sufficient for cyclists. Political beliefs clearly impact upon attitudes toward cycling safety thus the role they play in the debates that take place regarding risk assessment and safety measures should be considered.

#### Informing the Debates Amongst Cyclists

The debates about bicycle helmets, bikeways and cycling education that activist cyclists have amongst themselves, and occasionally with the political bodies who enact legislation in relation to these issues, were outlined in Chapter 1. These are worthy of further reflection especially insofar as finding common ground between the individual and social responsibility models.

1. **Mandatory helmet use.** Many cycling activists have fought hard against this legislation and an increasing body of work demonstrates that mandating helmet use can discourage cycling and the helmet's effectiveness in reducing head injuries may be overestimated. (Robinson, 1996; Cameron et al, 1994, Hillman, 1992: 328) Given this we would expect that respondents who cycle, especially those who have more experience and knowledge about the issues, would be more likely than non-cyclists to disfavour a helmet law. This was overwhelmingly the case. Cyclists, regardless of whether or not they were male or female, white or visible minority, or with low or high environmental concern, all were more likely to disagree that mandatory helmet laws should be put into effect. Left-wing cyclists were overwhelmingly against helmet laws whereas right-wing cyclists were anomalous in that they were more likely to favour, than disfavour, mandatory helmet laws. Given the impact of political beliefs on support for individualistic safety measures, this is not a surprising result.

2. **Bikeways.** There is widespread support for bicycle lanes and paths amongst both cyclists and non-cyclists alike. This has been verified many times throughout the years. The two most notable examples are the 1993 bike lane petition signed by nearly 28,000 Torontonians (Egan, 1993: 12) and the 1999 Decima survey which determined that between 66 and 76% of respondents considered bikeways to be the most important cycling improvement needed in Toronto. In the survey conducted in 2000, an astonishing 94% of respondents were in favour of bike lanes and paths. This support crossed all divisions—sex, racial status, political orientation. As there is considerable evidence to suggest that bikeways improve the cycling environment and cause more people to cycle, there does seem to be a very clear mandate here for municipal politicians and staff alike.

3. **Cycling education.** Training for cyclists, especially as incorporated in John Forester's *Effective Cycling* program, is a hotly debated matter within the cycling community. The findings in response to this item were similar to those in response to mandatory helmet laws. Respondents who were non-cyclists were much more likely to be in favour of requiring cycling instruction than were those who were cyclists. Again, right-wing cyclists were an anomalous group in that they were the only cyclists more likely to favour, than disfavour, a program requiring all cyclists to receive training. Interestingly, although many respondents were in favour of the concept theoretically, very few had been trained (8%) and most (71%) had never personally considered taking a cycling training course.

The results of this survey provided some new information that could advance the debates. Considerable support exists for a social responsibility model of cycling safety, especially as undertaken through the building of bikeways. The personal responsibility model (helmet legislation and cycling training requirements) also enjoys support, amongst non-cyclists and right-wing cyclists in particular. Although there seems to be very little that could be achieved as far as reconciling helmet legislation within the social responsibility model, the depolitization of cycling education is a more hopeful possibility. Widespread support exists for implementing policies and educational programs to shift the norm away from the automobile. As well there is general agreement that provisions made for

cyclists must not marginalize them. This is important common ground between the individual and social responsibility models thus should be reflected in future cycling policy and educational context.

### Risk and Risk Perception

Just how safe are cyclists? There is some evidence to suggest that the level of risk run by cyclists is comparable to the risk for motorists (Carre, 1995: 219). As a bicycle is inherently less dangerous than a car, even this level of risk is unacceptable especially considering the fact that there are present-day examples which show that the implementation of social responsibility measures not only increase cyclists' safety but increase the numbers of those citizens willing to cycle. That North American cyclists are roughly four times more likely to be killed than cyclists in the Netherlands (Pucher & Dijkstra, 2000: 14) is proof that an individualistic approach is not in cyclists' best interests. Furthermore, we know that many cyclists and potential cyclists FEEL that cycling in Toronto is unsafe which is not an indication in and of itself to make changes, but it is when compounded with the knowledge of the inflated risks that cyclists must take.

The more experience cyclists have, whether they have received formal training or not, the more confident they are likely to feel. Due to this phenomenon, especially within an individualistic society such as ours, right-wing cyclists assert that confidence and superior bike handling skills should be a precondition to cycling. This serves to heighten the already inequitable traffic situation that exists for novice cyclists and unconfident cyclists alike. Politics needs to be taken out of the mix as much as possible, thus increasing the likelihood that the measures taken actually increase safety.

### Proposals for Moving Toward a Social Responsibility Model of Cycling

To conclude, if guiding principles such as those below informed the decision-making process of transportation planners, politicians and cycling advocates alike there could be a better chance of achieving the goal of a safer traffic environment for cyclists. There is no claim made that these proposals are depolitized but they do have the objective of finding common ground between the individual and social responsibility models. The hope is that the cycling discourse in Toronto moves beyond the present one-dimensional understanding of achieving equality only through sameness and will no longer be subsumed by car-oriented planning. What is needed is for each transportation mode to be considered with respect to its own characteristics and requirements. This will lay the foundation for the essential norm shift away from the automobile thus resulting in cycling and other non-motorized modes of transport achieving superior status.

### Bicycle Safety

Principle #1. The safety measure should not increase inequity for cyclists.

This can be accomplished by determining whether the safety measure is designed to protect the individual from danger imposed by him/herself or by another party who is free to go without restraint. To this end, Catania argues that any new law to improve safety "should have the primary goal of preventing a citizen from threatening the life of others." (Catania, 1992: 417) In the case of helmets, for example, if it is determined they are necessary because the mode of transportation they have

chosen themselves is dangerous, this is a more equitable application. However if the mode of transportation being protected against is someone else's then a mandatory helmet law is not just.

**Principle #2.** The safety measure should be directed at the root causes of threats to safety, not the effects.

Determine whether there are more effective measures that could be taken but because they are politically difficult they are not being considered. Implementing legislation that is easier because the target group has no real power is unjust. As Hillman argues "it is unjust to put the onus of safety onto cyclists themselves while the primary source of the danger, namely the motor vehicles, remains unchanged." (Hillman, 1992: 329) Bike lanes, for example, should not be put in place to get cyclists out of the way of cars. They should replace traffic lanes or parking, not be added on without a coinciding reduction in car volume and/or speed.

**Principle #3.** Consider the needs of the most vulnerable first.

Anyone travelling by non-motorized transportation would fit in this category. A new right-of-way hierarchy as is in place in York, England (Mathew, 1997) and recommended by the Toronto coroner (Lucas, 1998: 17) would be one consideration which would make sense if this principle were enacted.

**Principle #4.** Consider the impact of political orientation on attitudes toward safety.

Expect widespread support, regardless of political beliefs, for most systemic solutions. However, reluctance to support social cycling improvements may be expressed by those with right-wing political views who are more likely to propose and support individualistic measures. It is unlikely that a political bias will not be present during any discussion about safety. Political orientation seems to have an even stronger impact on belief systems than do factors such as sex and visible minority status.

### Bicycle Education

**Principle #5.** Adapt a theoretical approach that goes beyond individualistic strategies.

Before considering implementing an existing program, first explore the theoretical framework to ensure it meets the needs of *all* cyclists and potential cyclists. Identify the skills that are neutral, technical skills from those that are more ideologically based.

**Principle #6.** Incorporate transformative learning strategies and a knowledge-building approach to cycling training.

Draw on the knowledge of different types of cyclists (ie vehicular, transformative, novice, voluntary, involuntary, etc.) Encourage learners to situate the skills-based cycling training activity within the world and to advocate for change.

**Principle #7.** Recommend a personal solution to a societal problem only in conjunction with discourse involving how the larger problem is also being addressed.

"Taking the lane", for example, is an adaptive strategy taught to overcome a systemic problem. Work to ensure that for every dollar spent on cycling education there are many more spent on bikeways and measures to reduce car traffic and speed. Not only have these more systemic measures proven more effective but they are also more popular. 94% of respondents were in favour of bike lanes whereas only 29% had ever considered taking a cycling training course.

**Principle #8.** Ensure that the cycling training program is suited for varying levels of strength and confidence.

As the basic requirements of *Effective Cycling* show "disproportionate results of different groups" (Epperson, 1994: 6), it is time for North American cycling educators to improve upon the cycling training programs that are being offered.

### Bicycle Planning

**Principle #9.** Plan for cyclists to ride apart from motor vehicle traffic.

Simply speaking, most people like to cycle away from cars unless the cars are few and going slowly. Given this the first priority should be to slow down and reduce the number of cars. When this cannot be achieved, bikeways should be designed. If studies show that crashes occur on these facilities this should not lead to the abandonment of these facilities but to their improvement.

**Principle #10.** Encourage those outside of bicycle planning per se to shift their focus from motor vehicles only and to "think bicycle."

There are some conditions in place that are beneficial to cyclists but they are not purposefully planned for cycling. Ensure that those responsible understand the importance to cyclists so that bicycle planners are alerted when changes are made. For example, traffic lane widths on existing urban roads that are wide enough for a motor vehicle and bicycle to share should not be redesigned without thinking about the impact on cyclists.

**Principle #11.** Plan specifically for the bicycle.

In moving away from a framework in which the bicycle is considered to function the same as a car, special measures specifically for bikes need to be designed. Many of these are already being used in "bicycle-friendly" countries and some are also instantiated in Critical Mass rides (e.g. advanced stop lines and waiting areas for bikes at traffic lights, priority lights, contra-flow lanes, exemptions for cyclists from facilities and legislation implemented for motor vehicles, etc.)

**Principle #12.** Consider the needs of involuntary and/or reluctant cyclists.

This research has shown that a latent desire to cycle exists primarily amongst white men. Planning for a group that is motivated to cycle already is relatively easy whereas putting systems in place to encourage cycling amongst those who do not consider cycling a viable transportation option is more challenging. Despite the fact that visible minorities and women do not indicate more support for the

social responsibility model than other groups, there is evidence to suggest that when this model is in place women cycle more. (Welleman, 1999; Lehner-Lierz & Schrod, 1992)

### Bicycle Encouragement

#### Principle #13.

Campaigns and incentives to encourage people to cycle serve an important function. Regardless of political belief, cyclists are more aligned with each other in support for social improvements for cycling than are non-cyclists. Thus gaining more cyclists is an integral component of establishing a social responsibility approach to cycling safety. Not only would the process of implementing bicycle infrastructure become less politicized, an added benefit is that cyclists are safer in cities with a higher proportion of bicycle traffic. (McClintock, 1992a)

## **Appendix A**

### **Definitions**

**Advanced stop line.** A "cycling facility which allows cyclists to stop ahead of motor vehicles at signalised [intersections]. Their function is to aid cyclists through the [intersection] effectively and safely." (Ryley, 1996: 3)

**Bicycle-friendly features/facilities.** This can refer to a wide range of incentives including bicycle lanes, bicycle paths, advanced stop lines, bicycle-only traffic signals, compact and dense urban form, low motor vehicle volume, low motor vehicle speed, etc.

**Bicycle lane.** A lane on the roadway that is intended primarily for cyclists, typically demarcated from motor vehicle traffic by a white line and a bicycle stencil.

**Bicycle path.** A path not part of the roadway that is intended primarily for cyclists, typically demarcated from pedestrians by a white line and a bicycle stencil.

**Bikeway.** Bicycle-only facilities parallel and/or adjacent to roadways. Generally an American term which does not distinguish between bike lanes and bike paths.

**Contra-flow lanes.** Opening up one-way streets for cyclists to ride in the wrong direction.

**Traffic Calming.** A more holistic approach to traffic planning which considers all possible types of traffic on public streets through striving "to maximise exchanges while minimising travel..." (Engwicht, 1993: 170) Its primary function is to slow motorized traffic down, not by speed limits, traffic lights or enforcement but through road design which makes drivers "feel" like they should not be driving quickly.

## Appendix B

### Cycling Survey

*This survey seeks information on cycling in Toronto for a M.A. thesis study and will take 2-3 minutes to complete. Please feel completely free to choose not to participate or to withdraw at any time if you wish. As all responses are confidential, please do not sign your name. Completing this survey indicates your consent to participate in this study. Thank you for your time.*

**1a.** Do you ever ride a bike in good weather for any of the following reasons?

To get to work?	Yes [ ]	No [ ]	To go shopping/visiting?	Yes [ ]	No [ ]
To get to school?	Yes [ ]	No [ ]	For recreation/fitness?	Yes [ ]	No [ ]

If **NO** for all of the above, please go to #2a. If **YES** for any and/or all, proceed to #1b.

**1b.** For each of the following statements, would you say you are comfortable cycling on ...

Bike trails or paths	Yes [ ]	No [ ]	Don't Know [ ]
Residential streets	Yes [ ]	No [ ]	Don't Know [ ]
Major roads with bike lanes	Yes [ ]	No [ ]	Don't Know [ ]
Major roads without bike lanes	Yes [ ]	No [ ]	Don't Know [ ]

**1c.** Please identify as *many* of the following categories that you feel describes you as a cyclist.

Cyclist with little or no political/professional involvement	[ ]
Cycling activist	[ ]
Cycling professional/expert (ie bicycle planner, CAN-Bike instructor, bicycle courier, etc)	[ ]

**2a.** Some people would like to ride a bike in Toronto more than they do, even those who already ride. Would you like to cycle more than you do? Yes [ ] No [ ]

If **NO**, please go to #3. If **YES**, proceed to #2b.

**2b.** Please describe the conditions under which you would cycle more than you do now.

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**3.** All Ontario cyclists under age 18 are required to wear a helmet. What is your opinion of this law?

In favour [ ]                      Not in favour [ ]                      Don't Know [ ]

**4.** Have you ever considered taking a cyclist training course to enhance your cycling skills?

Yes [ ]                      No [ ]                      Have already taken CAN-Bike or similar course [ ]

5. Please identify the *one* mode of transportation you use most often during a typical week in the summer (i.e. how do you usually travel?)

Car [ ]      Public Transit [ ]      Bicycle [ ]      Walk [ ]      Other \_\_\_\_\_

6. How many motor vehicles do you own? (If none, write zero.) \_\_\_\_\_

6a. If zero, is this by choice?      Yes [ ]      No [ ]

7. In response to the items below about possible concerns and solutions regarding cycling in Toronto, please circle a number between 1 and 4 to indicate your level of agreement.

**Key: Strongly Agree=1, Somewhat Agree=2, Somewhat Disagree=3, Strongly Disagree=4**

Cyclists should be required to have training in how to ride near motor vehicles	1	2	3	4
Cyclists should be required to pay lower fines for traffic offenses than motorists	1	2	3	4
Cyclists who know how to ride in traffic and obey traffic laws are safe on any Toronto street	1	2	3	4
Current levels of air pollution and smog in Toronto are harmful to humans	1	2	3	4
Health and/or fitness reasons reduce my ability to cycle	1	2	3	4
I don't have a bike and/or don't know how to ride	1	2	3	4
I don't like cycling	1	2	3	4
I live too far from most places I need to go to ride a bike there	1	2	3	4
I need to carry passengers and/or heavy loads which is difficult by bicycle	1	2	3	4
Motorists should be required to have training in how to drive near cyclists	1	2	3	4
My appearance is important and it's hard for cyclists to look nice	1	2	3	4
None of my close friends and/or family members cycle	1	2	3	4
Reducing the amount and speed of motor vehicle traffic would improve cycling in Toronto	1	2	3	4
The amount of governmental regulation in Ontario is adequate in the area of environmental protection	1	2	3	4
The weather in Toronto makes cycling difficult	1	2	3	4
There should be a law requiring cyclists of all ages to wear a bicycle helmet	1	2	3	4
There should be a right-of-way law in which motorized vehicles must yield to bicycles who in turn must yield to pedestrians	1	2	3	4
There should be more bike lanes and paths for cyclists in Toronto	1	2	3	4

8. If a provincial election were held today, how would you vote?

Conservative [ ]    Liberal [ ]    NDP [ ]    Green [ ]    Other \_\_\_\_\_

9. When you were growing up, what was your mother's primary occupation?

\_\_\_\_\_

10. When you were growing up, what was your father's primary occupation?

\_\_\_\_\_

11. In what year were you born? \_\_\_\_\_

12. What is your sex? Male [ ]                      Female [ ]

13. What is the highest level of education that you have completed?

Some high school [ ]                      High school graduate [ ]  
Some college or university [ ]      College or university graduate [ ]      Post-graduate [ ]

14. What is your current occupation?

Clerical [ ]                      Professional [ ]                      Homemaker [ ]  
Administrative/Manager [ ]      Academic/Teacher [ ]      General/Skilled Labour [ ]  
Technical/Computer Programming [ ]      Sales [ ]                      Unemployed/Retired [ ]  
Student [ ]      What is your program of study? \_\_\_\_\_  
Other [ ]      Please specify. \_\_\_\_\_

15. Were you born in Canada?    Yes [ ]    No [ ]

If YES, please go to #16. If NO proceed to #15b.

15b. In which country were you born? \_\_\_\_\_

15c. How old were you when you came to Canada? \_\_\_\_\_

16. Are you considered a visible minority member as defined by Statistics Canada? (e.g. Chinese, South/Southeast Asian, Black, Arab and West Asian, Filipino, Latin American, Japanese, etc.)                      Yes [ ] No [ ]

*Thank you for taking the time to complete this survey.  
Nancy Smith Lea, M.A. Candidate, Sociology and Equity Studies in Education, OISE/UT*

## **Appendix C**

### **Code Book**

If the respondent did not answer any of the questions, this was coded as "9"

1a. No=0, Yes=1

#### Cyclist Type

Not Cyclist: if Work AND School AND Shopping AND Recreation=0

Transportation Cyclist: if Work and/or School and/or Shopping=1

Recreation Cyclist: if Recreation=1

Both Types Cyclist: If Work and/or School and/or Shopping AND Recreation=1

1b. No=0, Yes=1, Don't Know=2

1c. Respondents were to tick off as many categories as applied. If this occurred, the highest numbered grouping prevailed.

Cyclist with little or no political/professional involvement=1

Cycling activist=2

Cycling professional/expert (ie bicycle planner, CAN-Bike instructor, bicycle courier, etc.)=3

2a. No=0, Yes=1

2b. Respondents were asked to provide written comments.

No=0, Yes=1

The responses were then rated based on the type of concern expressed:

Personal Concern=1

Social Concern=2

Both Personal and Social Concerns=3

Other (eg would only ride recreationally)=4

3. In favour=1, Not in favour=2, Don't Know=3

4. No=0, Yes=1, Taken CanBIKE=2

5. Car=1, Public Transit=2, Bicycle=3, Walk=4, Other=5

6. Number of motor vehicles owned indicated (0, 1, 2, etc.)

6a. No=0, Yes=1

7. 18 Likert-scale items. Strongly Agree=1, Somewhat Agree=2, Somewhat Disagree=3, Strongly Disagree=4.

*Cyclist education*

*Lower fines*

*Status quo (No Cycling Improvements variable)*

*Air pollution*

*Health problems*

*No bike*

*Don't like cycling*

*Distance*

*Passengers*

*Motorist Education*

*Appearance*

*Friends don't cycle*

*Traffic environment*

*Environmental governmental regulation*

*Weather*

*Helmet law*

*Right of way*

*Bike Lanes*

With the exception of the *environmental governmental regulation* item, all items were later converted as follows Strongly Disagree=1, Somewhat Disagree=2, Somewhat Agree=3, Strongly Agree=4.

These items were then compiled into five grouped categories that were scored as follows:

Strongly Disagree: 1.00-1.49=1

Somewhat Disagree: 1.50-2.49=2

Somewhat Agree: 2.50-3.49=3

Strongly Agree: 3.50-4.00=4

*Environmental Concern* (the average score of *air pollution* and *environmental governmental regulation*)

*Personal Cycling Concerns* (the average score of *health problems*, *no bike*, *don't like cycling*, *passengers*, *appearance* and *friends don't cycle*)

*Social Cycling Concerns* (the average score of *distance*, *traffic environment* and *weather*)

*Personal Cycling Improvements* (the average score of *cyclist education* and *helmet law*)

*Social Cycling Improvements* (the average score of *lower fines*, *motorist education*, *right of way* and *bike lanes*)

**8. Political orientation****Conservative and Liberal=1, NDP****Green and Otherleft (ie not Mike Harris)=2****Other (ie don't know, don't/can't vote)=9****9&10. Mother's and father's primary occupation****Homemaker=1****Professional (engineer, journalist, accountant, nursing, social work, banker)=2****Working class (electrician, hairdresser, construction, plumbing, sales, barber, farmer)=3****Other (artist, self employed)=4****11. Year born (subtracted this year from 2000)****Age 18-25=1****Age 26-30=2****Age 31-40=3****Age 41+=4****12. Sex****Male=0****Female=1****13. Education****Some high school=1****High school graduate=2****Some college or university=3****College or university graduate=4****Post-graduate=5****14. Occupation****Homemaker=1****Professional, administrative/manager, academic/teacher, technical/computer programming=2****Clerical, general/skilled labour, sales=3****Unemployed/retired=4****Student=5****Artist/designer=6****15. Born in Canada****0=No, 1=Yes**

**15b. Where born, if outside Canada****Europe (England, Ireland, Poland, France, Portugal, Romania)=1****Africa (Ghana, Ethiopia, Kenya, South Africa, Nigeria)=2****South America & Caribbean (Venezuela, Argentina, Suriname)=3****India&Asia (Iran, Sri Lanka, Philippines)=4****Southeast Asia (Hanoi Vietnam)=5****China & Korea (Hong Kong)=6****"Bicycle-Friendly" Europe (Germany, the Netherlands)=7****USA=8****16. Visible minority****0=No, 1=Yes**

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