

1 **FOUR TYPES OF CYLISTS? EXAMINING A TYPOLOGY TO BETTER**  
2 **UNDERSTAND BICYCLING BEHAVIOR AND POTENTIAL**

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1 **ABSTRACT**

2 Labeling or categorizing cyclists has been occurring for over a century for a variety of purposes.  
3 This paper aimed to examine a typology developed by the City of Portland that includes four  
4 categories: Strong and the Fearless, Enthused and Confident, Interested but Concerned, and No  
5 Way No How. Unlike several other typologies, this widely referenced typology is intended to  
6 apply to all adults, regardless of their current cycling behavior. Our analysis used a random  
7 phone survey (n=908) of adults in the Portland, Oregon, region that included both land-line and  
8 mobile phone numbers; data were weighted to better reflect the population. Adults were put into  
9 the four types based primarily upon their stated level of comfort cycling on a variety of facility  
10 types, their interest in cycling more for transportation, and their physical ability to bicycle.  
11 Nearly all of the sampled population fit clearly into one of the four categories. A majority (56%)  
12 of the region’s population fit in the Interested but Concerned category – thought to be the key  
13 target market for increasing cycling for transportation. The analysis indicates that reducing  
14 traffic speeds and increasing separation between bicycles and motor vehicles, such as through  
15 cycle tracks, may increase levels of comfort and cycling rates. Women and older adults are  
16 underrepresented among the more confident adults and those who currently cycle for  
17 transportation.

18

## 1 INTRODUCTION

2 Typologies and classifications arise out of a desire to understand populations and apply  
3 categories that further a goal, be it academic or professional. From the dawn of bicycling in the  
4 United States, riders were being classified. To accommodate the burgeoning interest in bicycles  
5 and their predecessors, velocipedes, special bicycle riding rinks were created. Managers of these  
6 rinks created one of the first cyclist classification systems, isolating “timid toddlers,” still  
7 learning to ride these machines, from the classes of successively skilled riders in the rinks: the  
8 “Wary Wobblers,” “Go-it-Gracefuls,” and the “Fancy Few” (1). This early typology categorized  
9 riders according to their approach and appearance.

10 A 1994 FHWA report sought to outline bicycle facility design concepts that would cater  
11 to all cyclist types, which, the report proposed, included “Advanced Bicyclists” who can  
12 “operate under most traffic conditions;” “Basic Bicyclists” who are “less confident of their  
13 ability to operate in traffic without special provisions for bicycles;” and “Children” who bicycle  
14 under parental supervision (2). The 1999 AASHTO “Guide for the Development of Bicycles  
15 Facilities” echoed the FHWA report’s A, B, C of bicycle user groups, stating that “these three  
16 bicycle user types are a helpful guide to the highway designer” (3). These reports made only  
17 vague efforts to quantify the share of people in each group. One suggested that there were as  
18 many as 100 million people that own bicycles in the United States, but perhaps only 5% could be  
19 classified in the advanced category (2), while the other simply stated that “some” adults fall into  
20 the advanced category, but “most” fall into the basic category (3). These typologies categorized  
21 existing bicycle users based on their skill level, but did not seek to categorize cyclists based on  
22 their purpose (e.g. recreation, transportation, etc). Further, they encouraged catering to “basic”  
23 users, but did not explicitly consider those who are not currently bicycle users.

## 24 BACKGROUND AND LITERATURE REVIEW

25 In 2006, the Portland Office (now Bureau) of Transportation released a paper suggesting  
26 a new typology of cyclists titled “Four Types of Cyclists” (4). The paper, written by Portland  
27 Bicycle Coordinator Roger Geller, focused on riding for transportation purposes, and suggested  
28 that cyclists fell into one of four categories: The Strong and the Fearless, The Enthused and  
29 Confident, The Interested but Concerned, or No Way No How. Geller’s categories are in part  
30 determined by a person’s comfort riding a bicycle on different types of bikeways. Strong and  
31 Fearless cyclists will ride “regardless of roadway conditions” and take a “strong part of their  
32 identity” from riding a bicycle. Enthused and Confident cyclists are comfortable riding on a road  
33 with automobiles, but “prefer to do so operating on their own facilities” and appreciate efforts  
34 made to improve the bikeway infrastructure. Interested but Concerned people are “curious about  
35 bicycling,” like to ride, but are afraid to do so and therefore do not regularly ride and “will not  
36 venture out onto the arterials.” Finally, the No Way No How are not going to ride a bicycle, “for  
37 reasons of topography, inability, or simply a complete and utter lack of interest.” This  
38 categorization was intended to cover all adults, regardless of their current bicycling behavior.  
39 The paper suggests that the Strong and Fearless are less than one percent of the City of  
40 Portland’s population, while the Enthused and Confident are perhaps 7 percent. The Interested  
41 but Concerned are posited to comprise about 60 percent of the city. The No Way No How  
42 people comprised the remainder of the population, or about 33 percent. In its new Bicycle Master  
43 Plan, the City targeted the Interested but Concerned group as the market necessary to reach in  
44 order to achieve ambitious mode shift targets. As a result, the Plan emphasizes “low stress”  
45 facilities, such as bicycle boulevards and separated cycle tracks.

1 Geller's paper has generated much discussion among bicycle bloggers and advocates on  
2 well-read websites such as Bikeportland.org (5), Planetizen (6), and Reconnecting America (7).  
3 It has also gained considerable traction with bicycle planners. We identified at least fourteen  
4 recent city or regional bike plans (or supporting documents), including three in Canada and two  
5 in Australia, that referenced Geller's typology, either with or without attribution: Cambridge, ON  
6 (2008); Albany, NY (2009); Burlington, ON (2010); Palo Alto, CA (2011, draft plan); Los  
7 Angeles, CA (2011); South Bay, CA (2011 draft); Sunshine Coast, Australia (2011); Reno-  
8 Sparks, NV (2011); Lincoln City, OR (2011 plan toolkit); Melbourne, Australia (2012); Southern  
9 California Association of Governments (2012, plan appendix); Bloomington-Normal, IL (2012  
10 feasibility study); Lower Savannah Council of Governments, GA (2012 design guidelines); and  
11 Seattle, WA (2012 progress report).

12 Many of the plans have used the typology to demonstrate why investments in bicycle  
13 facilities are worthwhile. The 2011 plan for Sparks noted that Geller's typology shows how "a  
14 potential expansion of bicyclists could be attracted by investing in a better, safer bikeway  
15 system." The 2011 plan for Palo Alto argued that the city should plan for the "Interested but  
16 Concerned" group, and directly quoted Geller's paper to state that "riding a bicycle should not  
17 require bravery." Others simply used the typology to support the idea of building bikeways that  
18 are comfortable for a wide range of people. The plan for Cambridge, ON stated that the four  
19 types of cyclists "illustrate that there is great potential to change the behavior of a large  
20 proportion of the population, if changes to transportation infrastructure address the perception of  
21 cycling safety and comfort," while a plan for Sunshine Coast of Australia stated that "one of the  
22 main goals of an active transport plan is to convert non-cyclists to 'enthused and confident'  
23 cyclists." While the percentage breakdown of the four types of cyclists is qualified in Geller's  
24 paper as reasoned estimates, many of the citations of the typology do not provide the report's  
25 qualification. Sometimes the plans and studies used Geller's typology concept, but adapted the  
26 categories to fit their goals or perception of cyclist categories. For example, instead of No Way  
27 No How, Calgary called the group least likely to cycle the "Reluctant to Cycle." Seattle used the  
28 term "Willing but Wary" in place of Interested but Concerned.

29 Meanwhile, in the academic realm, some researchers have categorized cyclists to better  
30 understand the non-homogenous behavior amongst people who bicycle. Several studies use  
31 current cycling frequency to categorize cyclists. Winters et al (8) defined everyone who had not  
32 ridden a bicycle in the past year as a "potential cyclist," while all others were either occasional,  
33 frequent or regular. Similarly, Heinen et al (9) put commuters into three groups, non-cyclists,  
34 full-time cyclists (every working day), and part-time cyclists (at least once a year), and identified  
35 differences in attitudes between these groups. In their analysis of workers in two Swedish cities,  
36 Bergstom and Magnusson (10) added a seasonal dimension: Winter cyclist, Summer-only  
37 cyclist, Infrequent cyclist (less than two of five days a week), and Never cyclist. They identified  
38 the relative importance of factors that influenced the decision to commute by bicycle, such as  
39 exercise, cost, and the environment, and showed how they differed by category. Gatersleben and  
40 Haddad (11) took a different approach in identifying the "typical bicyclist" according to both  
41 cyclists and non-cyclists. They used factor analysis to identify four types (or stereotypes) of  
42 cyclists based upon answers to 50 questions about attributes of cyclists: responsible, lifestyle,  
43 commuter, and hippy-go lucky. These categories are discussed as a useful framework for  
44 understanding how people view cyclists, and therefore potentially useful in attempts to change  
45 perceptions. None of these studies attempted to estimate the share of the broader population that  
46 fit into each category.

1 In a study for London's Department for Transportation, Christmas et al (12) discuss the  
2 difficulty in segmenting the cycling population, concluding that the method must depend upon  
3 the intended purpose. For their purpose of road safety, the authors suggested including all or  
4 some of five variables: age, gender, motivation for cycling, cycling patterns, and cycling  
5 approaches. While they did not develop a typology, they noted significant diversity within the  
6 population cycling for utility (versus for leisure) and the likelihood that individuals may belong  
7 to more than one group.

## 8 **OBJECTIVES**

9 Geller's four types of cyclists has clearly resonated among many transportation professionals and  
10 is now helping to guide bicycle planning in a growing number of cities. Given this expanding  
11 role, it is useful to examine its origins and validity. He describes the intent and process as  
12 follows:

13 The intent behind its development was to get a better handle on our market  
14 for bicycle transportation. As such, it has been a useful tool, providing an  
15 organizing principle for understanding our target market and what we  
16 surmise their concerns and needs to be. As stated previously, the numbers  
17 assigned to each of these categories are not something over which any  
18 bicycle planner should be prepared to fall on their sword. These numbers,  
19 when originally assigned, were not based upon any survey or polling data, or  
20 on any study. Rather, they were developed based on the professional  
21 experience of one bicycle planner. Soon thereafter, these numbers were  
22 discussed and, in effect, vetted with various informed individuals and  
23 groups....But beyond that initial vetting of the idea there has been survey,  
24 polling and study data that continues to support the assignment of both  
25 numbers to and description of the categories. (4)

26 The objectives of this paper are to: (1) examine the validity of Geller's four types of cyclists in  
27 the Portland, Oregon region; (2) understand who falls into each type; and (3) use the typology to  
28 explore what might increase levels of cycling for transportation.

## 29 **METHODOLOGY**

30 The data were obtained through a random phone survey of adults in the Portland region. The  
31 sample included both land-line and mobile phone numbers and was conducted July 19 through  
32 August 10, 2011. A total of 902 interviews were completed. Of those, 130 (14 percent) were  
33 completed on mobile phones. The mobile phone sample was used to help reduce sampling bias,  
34 particularly among younger adults (13). The overall response rate was 20% of eligible numbers  
35 and 35% of resolved numbers (see 14 for definitions). The data were weighted by age and sex to  
36 reflect the population of the region using the 2010 U.S. Census. Respondents who indicated that  
37 they were physically unable to ride a bicycle answered a subset of the questions, focusing on  
38 attitudes and demographics. Thirteen percent of the weighted sample fell into this category,  
39 including about 40% of the respondents age 65 or older.

40 A key part of the research was to determine if the adult population fits into the four  
41 categories Geller created. To do so required a careful examination of the typology. A few things  
42 distinguish Geller's typology from the others described above. First of all, the primary intent is  
43 to understand the market for cycling, not just the population of current cyclists. Therefore, the  
44 typology is not solely based upon current riding behavior. Second, the focus is on cycling for

1 transportation and not recreation or leisure. A close examination of Geller's description of the  
2 types reveals that they are based firstly upon people's comfort level (fearless, confident,  
3 concerned) for different riding on types of facilities and secondly on people's interest in or intent  
4 to bicycle (enthused, interested, no way). Actual bicycling behavior is a not a primary factor in  
5 determining into which category someone falls.

6 The first step of the categorization process using the survey sample was based upon a  
7 series of questions about level of comfort cycling on various types of streets. For each  
8 hypothetical scenario, the respondent was asked to indicate their level of comfort on a scale of  
9 one to four, with one meaning "very uncomfortable" and four meaning "very comfortable." The  
10 scenarios were:

- 11 1. A path or trail separate from the street
- 12 2. A quiet, residential street with traffic speeds of 20-25 miles per hour
- 13 a. What if that also had bicycle route markings, wide speed humps, and other things that  
14 slow down and discourage car traffic?
- 15 3. A two-lane neighborhood commercial shopping street with traffic speeds of 25-30 miles  
16 per hour, on-street car parking, and no bike lane.
- 17 a. What if a striped bike lane was added?
- 18 4. A major urban or suburban street with four lanes, on-street parking, traffic speeds of 30-  
19 35 miles per hour, and no bike lane
- 20 a. What if a striped bike lane was added?
- 21 b. What if it also had a wide bike lane separated from traffic by a raised curb or parked  
22 cars?
- 23 5. A major street with two lanes in each direction, a center divider, on-street parking, traffic  
24 speeds of 35-40 miles per hour, and no bike lane
- 25 a. What if a striped bike lane was added?
- 26 b. What if it also had a wide bike lane separated from traffic by a raised curb or parked  
27 cars?

28 Level of comfort was determined primarily by the responses to the three scenarios involving  
29 non-residential streets (3, 4, and 5) with and without bike lanes. These scenarios best match  
30 Geller's description of the types. Geller described the Strong and Fearless as being willing to ride  
31 regardless of roadway conditions. Therefore, this group was defined as being very comfortable  
32 on non-residential streets without bike lanes. An average of 3.5 or higher on those three  
33 questions was defined as "very comfortable," meaning that the respondent would need to have  
34 answered "four" for comfort level on at least two of the scenarios and "three" for the other.  
35 Geller described the Enthused and Confident as being comfortable sharing the roadway with cars,  
36 but preferring to do so with their own facilities, such as bike lanes. Therefore, respondents  
37 having an average comfort level of 3.5 or higher for the three non-residential street scenarios  
38 with bike lanes (3a, 4a, and 5a) were put into this category. They can be considered as being very  
39 comfortable on non-residential streets with bike lanes. At the other end of the scale, respondents  
40 who indicated that they were very uncomfortable riding a bicycle on a path or trail separate from  
41 the street were put into the No Way No How category, along with the respondents who were  
42 physically unable to ride a bicycle.

43 This first step left a share of the respondents uncategorized. These are respondents who  
44 did not feel "very comfortable" on non-residential streets with or without bike lanes, but did not  
45 feel "very uncomfortable" on paths and trails. The second step used respondents' interest in  
46 cycling to determine whether these respondents should be either Interested but Concerned or No

1 Way No How. Respondents were asked to agree or disagree (strongly or somewhat) to the  
 2 statement “I would like to travel by bike more than I do now.” Those that agreed with this  
 3 statement were put in the Interested but Concerned category, and those that disagreed were put in  
 4 the No Way No How category. However, an examination of actual cycling behavior revealed  
 5 that some people who cycled for transportation in the past 30 days ended up in the No Way No  
 6 How category. This makes sense, in that some people who currently cycle may have no interest  
 7 in cycling more; their current level suits their needs just fine. Therefore, as a final step,  
 8 respondents who were not very comfortable cycling on non-residential streets and were not  
 9 interested in cycling more, but had cycled for transportation in the past 30 days were put into the  
 10 Interested but Concerned category. The need to do so points to the difficulty of categorizing  
 11 people based upon multiple dimensions, in this case comfort level and interest. Nearly all (91%)  
 12 of the adults placed in the Enthused and Confident category are interested in cycling more, which  
 13 makes the “enthused” part of the label largely accurate.

14 **FINDINGS**

15 **Distribution of Respondents by Cyclist Type**

16 The distribution of survey respondents into the four types appears in TABLE 1. The distribution  
 17 is similar to Geller’s estimate, though with a higher share of the adult population in the Strong  
 18 and Fearless and Enthused and Confident category and a smaller share in the No Way No How  
 19 category.  
 20

21 **TABLE 1 Distribution of Survey Respondents by Cyclist Type**

Type	Description	City of Portland	Rest of region	All	Geller’s estimate for City
<b>Strong &amp; Fearless</b>	Very comfortable without bike lanes	6%	2%	4%	<1%
<b>Enthused &amp; Confident</b>	Very comfortable with bike lanes	9%	9%	9%	7%
<b>Interested but Concerned</b>	Not very comfortable, interested in biking more Not very comfortable, currently cycling for transportation but not interested in biking more	60%	53%	56%	60%
<b>No Way No How</b>	Physically unable Very uncomfortable on paths Not very comfortable, not interested, not currently cycling for transportation	25%	37%	31%	33%
<b>n (weighted)</b>		436	479	915	

22 Note: Weighted data, may not total 100% due to rounding.

23  
 24 Respondents were then categorized based upon their current cycling behavior into one of three  
 25 groups:

- 26 • Utilitarian cyclist: Cycled at least once in the past 30 days for work, school, shopping,  
 27 etc. (“transportation”) and usually cycles once a month for transportation in a typical  
 28 summer or winter month
- 29 • Recreational cyclist: Cycled at least once in the past 30 days, but did not meet the  
 30 threshold for Utilitarian cyclist

- Non-cyclist: Did not cycle in the past 30 days or stated that they “never ride a bicycle” (a screening question).

With these definitions, someone who cycled at least once for transportation in the past month, but indicated that they do not cycle at least once a month in a typical summer *or* winter month for transportation, was categorized as a recreational cyclist. Therefore, the utilitarian cyclist category represents people who have some pattern of cycling for transportation that extends beyond the past month.

Contrary to what might be expected, similar shares of three of the four types (not including No Way No How) could be considered utilitarian cyclists (TABLE 2); 43% of the Strong and Fearless, 46% of the Enthused and Confident and 43% of the Interested but Concerned were classified as utilitarian cyclists.

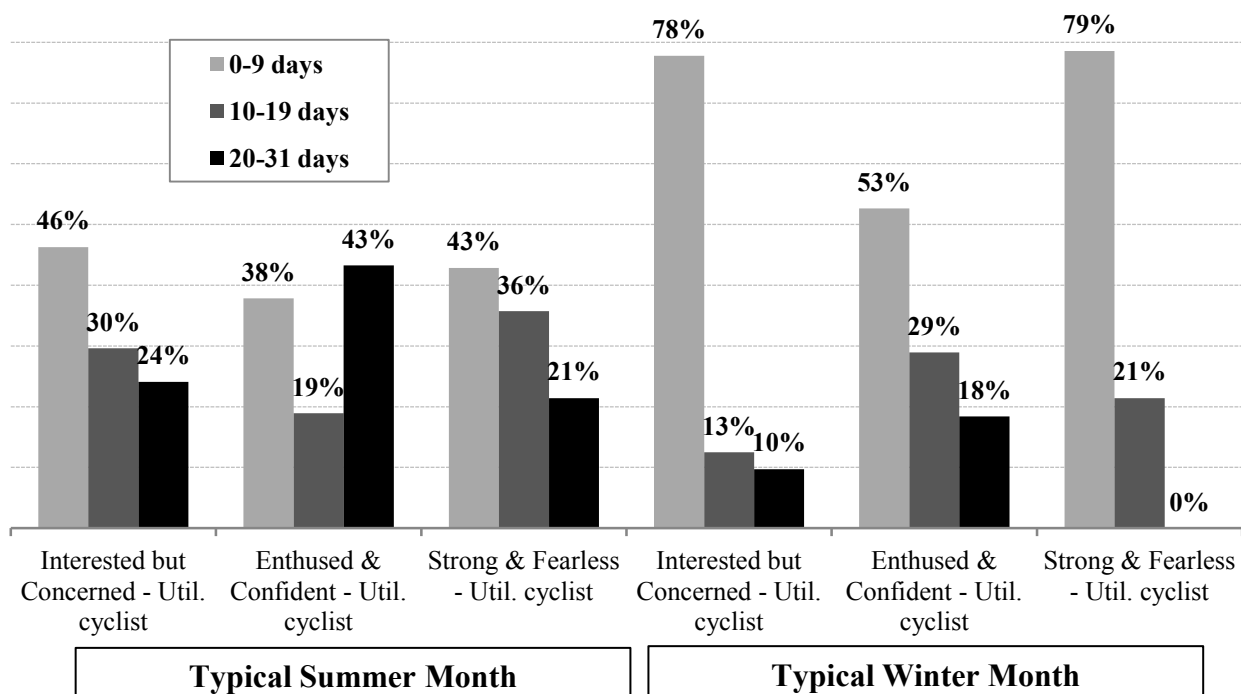
**TABLE 2 General Cycling Behavior, by Cyclist Type**

Type	Utilitarian	Recreational	Non-cyclist	Unable/ don't know	Total
<b>Strong &amp; Fearless</b>	43%	23%	34%		100% 35
<b>Enthused &amp; Confident</b>	46%	31%	23%		100% 82
<b>Interested but Concerned</b>	43%	30%	28%		100% 511
<b>No Way No How</b>		15%	46%	40%	100% 287

Note: Weighted data, may not total 100% due to rounding.

While the distribution of the types within these broader cycling behavior categories is similar, the actual amount of cycling does differ significantly between the types. Over the past month, the Enthused and Confident respondents cycled an average of 9.7 days, of which 4.2 were for work or school. This is significantly higher than the Interested but Concerned (6.2 days overall, 1.6 for work or school) and No Way No How (2.4 days, all for recreation). Figure 1 shows the number of days the utilitarian cyclists typically ride for transportation in both summer and winter months. The most significant differences are between the Interested but Concerned and Enthused and Confident groups; 24% of the former, compared with 43% of the latter cycle 20 or more days for transportation in a typical summer month. While all of the types cycle less often in winter months, the Enthused and Confident remain the group the cycles most often.





1

2 **FIGURE 1 Frequency of Cycling for Transportation by Cyclist Type**

3 **Demographics of Cyclist Types**

4 Many of the bicycle plans noted above acknowledge that if overall rates of cycling are to  
 5 increase significantly, cycling rates must increase among demographic groups who currently do  
 6 not cycle very much. In most major cities in the U.S., men make up a disproportionate share of  
 7 utilitarian cyclists (15). In our Portland sample, women are more likely to be in the No Way No  
 8 How and Interested by Concerned categories. In addition, within each of the four types women  
 9 are more likely to be non-cyclists (TABLE 3). For example, only 22% of the Enthusied and  
 10 Confident utilitarian cyclists are women, compared with 47% of the Enthusied and Confident  
 11 non-cyclists.

12 Older adults in the U.S. are also far less likely to cycle compared with many European  
 13 cities (16). This is shown in our data as well. Adults 55 years and older are over represented in  
 14 the No Way No How category (TABLE 3). The Enthusied and Confident group who is currently  
 15 cycling tends to be more middle-aged; 68% of those utilitarian cyclists are 35-54 years old. In  
 16 contrast, 37% of the Interested but Concerned utilitarian cyclists are 35-54 and 47% are adults  
 17 under 35.

18 We did not find any significant differences between the groups with respect to education  
 19 or income levels.

1 **TABLE 3 Demographics of the Cyclist Types**

	Age				% that never cycled to school as a child
	Women	18-34	35-54	55+	
Strong & Fearless	21%	86%	9%	6%	50%
Enthusied & Confident: Util. cyclist	22%	19%	68%	14%	35%
Enthusied & Confident: Rec. cyclist	20%	20%	60%	20%	36%
Enthusied & Confident: Non-cyclist	47%	32%	32%	37%	37%
Interested but Concerned: Util. cyclist	43%	47%	37%	17%	53%
Interested but Concerned: Rec. cyclist	43%	34%	47%	20%	51%
Interested but Concerned: Non-cyclist	58%	22%	41%	37%	42%
No Way No How: Rec. cyclist	52%	29%	52%	19%	68%
No Way No How: Non-cyclist	63%	25%	33%	42%	63%
No Way No How: Unable/Don't Know	78%	11%	17%	73%	Na
All	51%	32%	37%	31%	51%

2 Note: The Strong and Fearless category is not broken down by current cycling behavior because of the  
 3 small sample in that group.

4  
 5 Whether someone cycled to school as a child appears to influence which category they fall into.  
 6 The Enthusied and Confident group was the most likely to have cycled to school when they were  
 7 children (TABLE 3). A large majority, over 60%, of the No Way No How group had never  
 8 cycled to school as a child, indicating that this lack of experience may influence the level of  
 9 comfort and interest in cycling as an adult. However, the pattern is inconsistent; within the  
 10 Interested but Concerned group, the non-cyclists were actually the least likely to have never  
 11 cycled to school.

12 **Understanding the Market to Increase Utilitarian Cycling**

13 *Attitudes and Perceptions of the Four Types*

14 The intent of the typology was to guide efforts to increase bicycling for transportation. Exploring  
 15 differences between the groups with respect to attitudes and perceptions about cycling may  
 16 confirm whether the groups are distinct and, if so, explain the differences in cycling behavior  
 17 described above. Table 4 shows some questions where there were some significant differences  
 18 between the four groups. In some cases, the No Way No How group is the most distinct, with  
 19 insignificant differences between the other three groups. For example, that group is much less  
 20 likely to agree that they like riding a bike, want to travel by bike more, and see people like them  
 21 bicycling on city streets. The greatest differences among all four groups are for the questions  
 22 regarding traffic and safety. This makes sense, since the categories were created largely based  
 23 upon comfort levels cycling on different types of roads. In addition, there were several  
 24 significant differences between the four groups regarding how easy it is to ride a bike. The  
 25 Interested but Concerned respondents were significantly less likely than the Enthusied and  
 26 Confident to agree that “biking can sometimes be easier for me than driving” and that “for me to  
 27 ride a bike for daily travel from home would be easy.” In both cases the No Way No How group  
 28 was the least likely to agree.

1 **Table 4 Attitudes and Perceptions by Category**

Average level of agreement, 1=strongly disagree, 4=strongly agree	No Way No How	Interested but Concerned	Enthused and Confident	Strong and Fearless
I like riding a bike	1.9	3.3	3.5	3.1
I would like to travel by bike more than I do now	1.8	3.4	3.5	3.1
In general, I see people similar to me bicycling on city streets	2.6	3.0	3.1	3.2
Biking can sometimes be easier for me than driving	1.4	2.4	2.9	2.8
For me to ride a bike for daily travel from home would be easy	1.5	2.3	3.1	2.8
Traveling by car is safer overall than riding a bike	3.5	3.0	2.6	1.9
There is so much traffic along the street I live on that it would make it difficult or unpleasant to bike	2.0	1.8	1.4	1.3
There is so much traffic along nearby streets that it would make it difficult or unpleasant to bike	2.7	2.4	1.7	1.6
There are bike lanes that are easy to get to in my neighborhood	2.5	2.9	3.1	2.6
There are off-street bike trails or paved paths in or near by neighborhood that are easy to get to	2.5	2.8	2.9	3.1
n	170-173	507-511	81-82	31-34

2 Note: Significant differences exist between the groups for all factors based upon a one-way ANOVA test,  $p < 0.05$ .

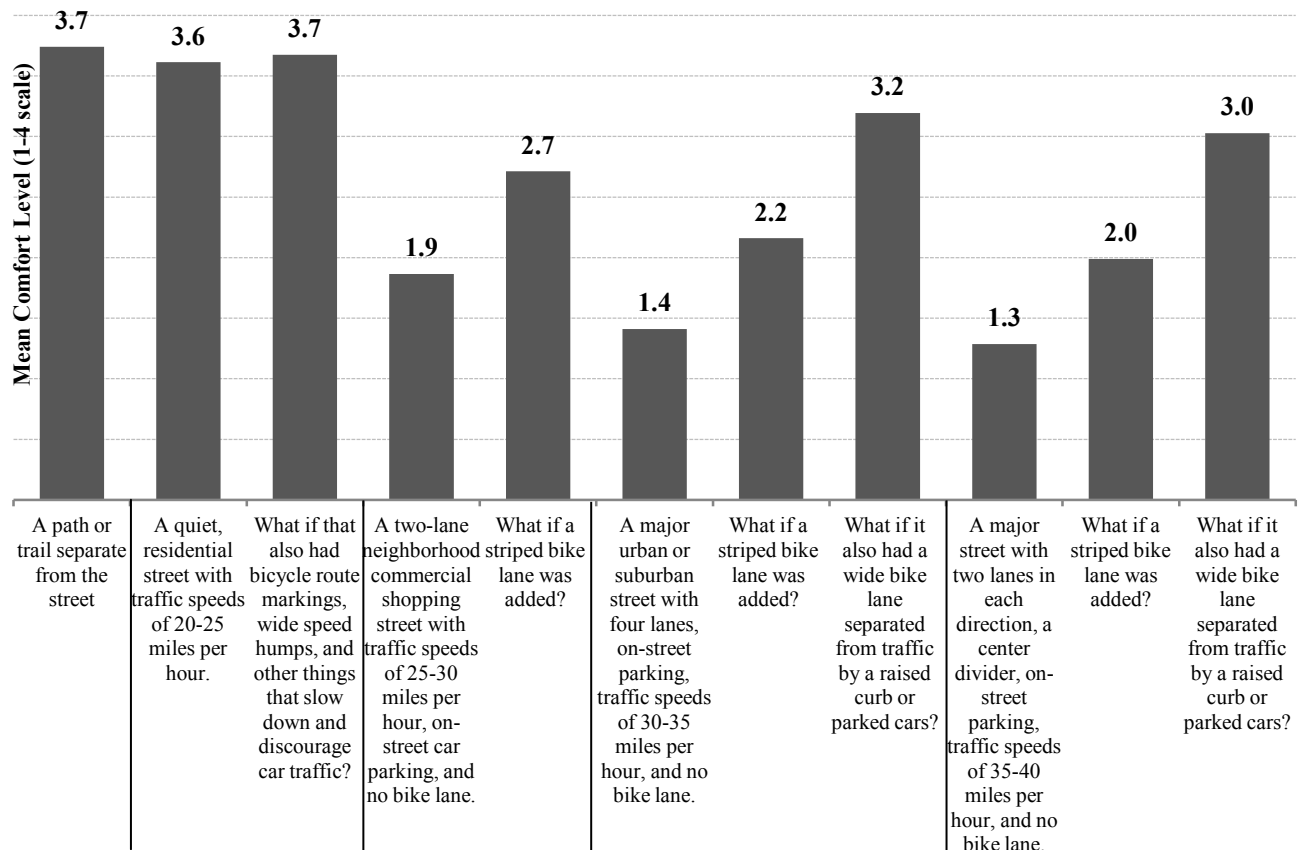
3  
4 The City of Portland, as well as many of the jurisdictions that have adopted the typology,  
5 have decided to focus on the Interested but Concerned group of cyclists as their target market for  
6 expanding cycling levels. This is the largest group. Moreover, the data above show that in many  
7 regards this group is distinct from the No Way No How and Enthused and Confident adults. In  
8 particular, their level of interest in cycling appears to be as high, but they have greater concerns  
9 about safety, traffic, and ease than the Enthused and Confident. And, they are currently cycling  
10 less than that group. Therefore, the final section of this paper focuses on the Interested but  
11 Concerned survey respondents.

12  
13 *Perception of Facility Types: Interested but Concerned*

1 Cities have a range of infrastructure and programmatic tools available to try to increase the share  
2 of people riding a bicycle for transportation. Infrastructure, particularly bike lanes and paths,  
3 have been a common approach for over 20 years. More recently, U.S. cities have been  
4 experimenting with other types of facilities, including bicycle boulevards and cycle tracks.  
5 Bicycle boulevards use traffic calming tools, such as speed humps and traffic diverters, and other  
6 traffic control devices on low-volume streets, to slow down and reduce the volume of motor  
7 vehicle traffic. Coupled with signage, these facilities have been shown to attract cyclists (18).  
8 Cycle tracks operate similar to bike lanes along major streets, but incorporate a physical barrier  
9 between motor vehicles and bicycles, such as a curb, bollards, and/or parked cars. The survey's  
10 questions regarding comfort level on various types of streets included these types of facilities  
11 using a short description (see 2.a., 4.b., and 5.b. in the list in the Methodology section).

12 These survey responses reveal some significant differences in comfort level between a  
13 regular striped bike lane and a cycle track (FIGURE 2). Comfort levels are highest on quiet  
14 residential streets with or without the traffic calming features and equally high on a separated  
15 path or trail. For non-residential streets, comfort levels generally rise as separation increases  
16 between the cyclist and motor vehicles. The cycle track facility on the 4-lane street without a  
17 center divider and speeds of 30-35 mph yielded a level of comfort (3.2) approaching that of a  
18 quiet residential street (3.6) or separate path (3.7).

19



1  
 2 **FIGURE 2 Average Level of Comfort Cycling on Various Facilities, Interested but**  
 3 **Concerned**  
 4

5 *Perceptions of Physical Environment Factors*

6 Within the Interested but Concerned group, just over 40% were currently cycling some for  
 7 transportation. Examining the differences between this subgroup and those that currently do not  
 8 cycle or cycle primarily for recreation may reveal the barriers to cycling that could be addressed  
 9 through infrastructure or programs. TABLE 5 shows the share within each of the Interested but  
 10 Concerned subgroups that agreed (strongly or somewhat) with a series of statements about their  
 11 neighborhood. The non-cyclists were significantly less likely than the utilitarian cyclists to agree  
 12 that there were bike lanes that were easy to get to and more likely to agree that there was so  
 13 much traffic on nearby streets that it would be difficult or unpleasant to bike.

1 **TABLE 5 Perceptions of the Physical Environment among the Interested but Concerned**

	Interested but Concerned (% agreeing)		
	Non-cyclist	Recreational cyclist	Utilitarian cyclist
<i>Perceptions of the Physical Environment</i>			
There are off-street bike trails or paved paths in or near my neighborhood that are easy to get to.	63%	64%	70%
There are bike lanes that are easy to get to.	<b>66%</b>	<b>62%</b>	78%
There are quiet streets, without bike lanes, that are easy to get to on a bike.	92%	<b>81%</b>	94%
There is a high crime rate in my neighborhood. -	19%	13%	19%
There is so much traffic along the street I live on that it would make it difficult or unpleasant to bike.	28%	28%	20%
There is so much traffic along nearby streets that it would make it difficult or unpleasant to bike.	<b>61%</b>	<b>53%</b>	43%
The speed of traffic on most nearby streets is usually slow.	56%	<b>53%</b>	64%
Most drivers exceed the posted speed limits in my neighborhood.	68%	<b>73%</b>	61%
Streets in my neighborhood are poorly maintained.	25%	26%	18%
n	141	153	217

2 Note: **Bold** indicates a significant difference from the Utilitarian cyclist group,  $p < 0.05$ , 2-tailed

3  
4 *Perceptions of Social and Personal Factors*

5 Several questions on the survey were intended to address social and personal factors that may  
6 affect decisions to cycle (TABLE 6). Within the Interested but Concerned group, levels of social  
7 support and influence appear to be significantly lower for the non-cyclists and recreational  
8 cyclists, compared with the utilitarian cyclists. For example only 17% of non-cyclists live with  
9 people who bicycle for transportation, compared with 53% of the utilitarian cyclists. Fewer of  
10 the non-cyclists also indicated that they have co-workers who bike to work or see people similar  
11 to them bicycling on city streets.

12 The non-cyclists and recreational cyclists also seem to have more personal barriers  
13 preventing them from cycling. They were less likely to agree that bicycling for daily travel  
14 would be easy, that places they need to get to are within biking distance and more likely to say  
15 that they don't have time to bike instead of driving. These barriers are related to the physical  
16 environment, both infrastructure and land use. Clothing and helmets may not be a significant  
17 barrier; while 72% of the non-cyclists indicated that biking for commuting would require them to  
18 wear different clothing, this was not significantly higher than the 69% of the utilitarian cyclists  
19 who agreed. Less than one-third of the non-cyclists indicated that they did not like wearing a  
20 helmet, similar to the other subgroups. The large majority (83%) of the non-cyclists indicated  
21 that they knew how to ride safely in traffic, though 63% indicated a desire to learn how to ride  
22 more safely in traffic. The non-cyclists were also less likely to feel comfortable riding in the rain  
23 and after dark. The three subgroups were equally and highly (over 80%) likely to be concerned  
24 about being hit by a motor vehicle, but not by being hit by another bicyclist.

25

1 **TABLE 6 Social and Personal Factors among the Interested but Concerned**

	Interested but Concerned (% agreeing)		
	Non-cyclist	Recreational cyclist	Utilitarian cyclist
<b><i>Social Factors</i></b>			
Most people who are important to me, for example my family and friends, think I should bike more.	<b>33%</b>	<b>29%</b>	48%
Most people who are important to me, for example my family and friends, would support me in using a bike more.	90%	89%	94%
People I live with ride a bike to get to places, such as errands, shopping, and work.	<b>17%</b>	<b>17%</b>	53%
Many of my friends ride a bike to get to places, such as errands, shopping, and work.	<b>43%</b>	<b>37%</b>	79%
Many of my co-workers ride a bike to get to work.	<b>36%</b>	<b>30%</b>	51%
In general, I see people similar to me bicycling on city streets.	<b>71%</b>	<b>76%</b>	85%
<b><i>Personal Factors</i></b>			
I feel a personal obligation to bicycle instead of driving for everyday travel.	<b>18%</b>	<b>17%</b>	54%
For me to ride a bike for daily travel from home would be easy.	<b>19%</b>	<b>17%</b>	55%
I know where safe bike routes are in my neighborhood.	<b>69%</b>	<b>78%</b>	94%
Many of the places I need to get to regularly are within biking distance of my home.	<b>63%</b>	<b>47%</b>	73%
I don't have time to bike places instead of driving.	<b>62%</b>	<b>69%</b>	49%
Biking for commuting or transportation requires me to wear different clothes than normal.	72%	<b>84%</b>	69%
I don't like wearing a bike helmet.	31%	33%	36%
I know how to ride a bike safely in traffic.	<b>83%</b>	93%	100%
I would like to learn how to ride more safely in traffic.	63%	57%	61%
There is secure bike parking at my work or school.	<b>73%</b>	<b>73%</b>	83%
I would feel comfortable riding my bike when it is raining.	<b>23%</b>	<b>28%</b>	47%
I would feel comfortable riding my bike in my neighborhood after dark.	<b>48%</b>	<b>51%</b>	67%
<b><i>Concerns</i></b>			
If or when I ride a bike, I'm concerned about...			
...being hit by a motor vehicle.	82%	84%	84%
...being hit by another bicyclist.	12%	14%	18%
...being bitten by a dog.	<b>23%</b>	<b>23%</b>	14%
...falling off my bike.	32%	21%	23%
...being stranded away from home.	<b>31%</b>	25%	20%
...having my bicycle stolen.	64%	63%	63%
n	141	153	217

2 Note: **Bold** indicates a significant difference from the Utilitarian cyclist group, p<0.05, 2-tailed

3

4 **CONCLUSION AND POLICY IMPLICATIONS**

5 Labeling or categorizing cyclists has been occurring for over a century for a variety of purposes.

6 The FHWA and AASTHO typologies from the 1990s were aimed at designing for the needs of

7 current cyclists. There was no explicit attempt to apply the typology to the entire population or

1 use it to examine the potential market for expanding cycling. Typologies developed by  
2 researchers have primarily served the purpose of understanding the varied behavior of existing  
3 cyclists. Geller's typology developed for the City of Portland, in contrast, aims to conceptualize  
4 the pool of existing and potential cyclists. As its proliferation in bicycle plans nationally  
5 demonstrates, it filled a need that was lacking.

6 Using a random survey of adults in the Portland region, this research found that overall  
7 the typology appears to work well in distinguishing adults with respect to cycling. Nearly all of  
8 the sampled population fit clearly into one of the four categories. The process did use what could  
9 be considered arbitrary cut-off points for defining respondents' level of comfort. However,  
10 changing these would simply affect the distribution of the population among the categories, not  
11 whether someone fit into any of the categories.

12 The typology does appear useful in distinguishing potential markets for cycling and  
13 understanding why some adults do not currently cycle for transportation. Some of the key  
14 findings and implications are as follows:

- 15 • Women are most likely to be in the No Way No How category or non-cyclists in the  
16 Enthused and Confident and Interested but Concerned categories. The barriers preventing  
17 them from cycling for transportation must be better understood if cycling rates are to  
18 increase significantly. Other research indicates that common barriers include concerns  
19 about traffic, different attitudes towards bicycling, and complex travel patterns, including  
20 transporting passengers (e.g. children and older parents) (15)
- 21 • Older adults (over 55) are also more likely to be in the No Way No How category or non-  
22 cyclists in the Enthused and Confident and Interested but Concerned categories. The  
23 large share in the No Way No How category is largely due to respondents indicating a  
24 physical inability to ride a bicycle. Non-traditional bicycle technologies, including  
25 electric-assist bicycles (e-bikes) and adult tricycles, might overcome this barrier for some  
26 older adults (16).
- 27 • There is a correlation between cycling to school as a child and levels of comfort cycling  
28 as an adult. The Enthused and Confident adults were most likely to have cycled  
29 frequently to school as a child, while the majority of No Way No How adults said that  
30 they never rode to school as a child. Cycling to school does not appear to affect whether  
31 an adult *within* one of the categories is currently cycling for transportation or recreation,  
32 however. Because cycling *frequency* does vary by category, these findings do lend  
33 support to the hypothesis that increasing cycling to school could have longer lasting  
34 effects on overall rates of cycling.
- 35 • The Interested but Concerned adults do represent the largest potential market for  
36 increasing cycling for transportation. Bicycle infrastructure that increases their physical  
37 separation from motor vehicles, such as cycle tracks, increases their reported level of  
38 comfort significantly. This would seem a necessary condition to increasing their levels of  
39 cycling for transportation.
- 40 • General concern about the amount of traffic and traffic speeds in neighborhoods, along  
41 with a lack of bike lanes and destinations nearby, appears to be preventing Interested but  
42 Concerned adults from bicycling either for transportation or recreation. Besides bicycle-  
43 specific infrastructure, traffic speed controls, traffic calming, and planning that promotes  
44 a mix of land uses could help overcome these barriers.
- 45 • Social support for bicycling may influence whether an Interested but Concerned adult  
46 does cycle for transportation. Those who did not were less likely to live or work with



1 people who bicycle for transportation or see people who look like them cycling on city  
2 streets.

- 3 • Time constraints are an important barrier to cycling for transportation among the  
4 Interested but Concerned. Overcoming this barrier is challenging. Land use and street  
5 patterns that shorten travel distances between destinations can help, as well as more direct  
6 bicycle infrastructure. E-bikes may also be a solution for some adults.
- 7 • Self-reported knowledge of safe bicycling practices in traffic are very high (over 80%  
8 among the Interested but Concerned), though a majority of all subgroups did indicate an  
9 interest in learning more. These findings make it unclear whether or how much cycling  
10 education efforts would change levels of cycling. On the other hand, non-cycling  
11 Interested but Concerned adults felt considerably less comfortable cycling in the rain or  
12 in the dark. Education might address these concerns, by teaching people what gear to use  
13 in these conditions, as well as riding techniques specific to wet and/or dark conditions.

14  
15 The applicability of the typology to other U.S. cities should be tested. It is likely that the  
16 distribution of any other city's population among the four types will differ. Without replicating  
17 the study elsewhere, it is hard to know if the magnitude of any differences would be significant  
18 enough to affect the usefulness of the typology for planning purposes. Our survey findings  
19 indicate that the physical environment influences the share of the population in each category. A  
20 key question for additional research is whether and how much the physical environment for  
21 bicycling (e.g. bicycle infrastructure, land use, street connectivity, hilliness, etc.) affects the two  
22 key components of the typology: comfort levels on different facilities and interest in cycling  
23 more. Other factors, such as the driving styles of motor vehicle drivers (e.g. level of  
24 aggressiveness, speeds, etc.) may also influence levels of comfort and interest.

25 An additional area for further research is the subgroups of cyclists labeled here as  
26 recreational cyclists. These adults were found within all four types. They had ridden a bicycle in  
27 the past month, but do not do so regularly for transportation. Very little research exists  
28 examining the theory that people who cycle for recreation may more easily transition to cycling  
29 for transportation and people who do not bicycle at all. This is an example of where longitudinal  
30 research, perhaps involving an intervention, could be useful.

31 Finally, the aim of this paper was to examine Geller's typology, which is increasingly  
32 being used in other cities. It would perhaps be equally enlightening to develop a new typology  
33 from scratch. A clear purpose and intended use is key in developing an internally consistent and  
34 useful typology. As discussed above, one challenge is separating actual bicycling behavior from  
35 levels of comfort and interest. A typology intended to help plan for a future with higher rates of  
36 cycling needs to apply to all adults, whether they bicycle or not.

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