Bicycling and Walking in North Carolina:
Results of a Year 2000 Survey

Produced for the

North Carolina Department of Transportation
Division of Bicycle and Pedestrian Transportation

by

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Introduction

Bicycling and walking are popular activities for North Carolinians. We like to bicycle around town, walk to nearby restaurants or shopping areas, and ride or jog in our neighborhood or along off-road trails. Bicycling and walking are viable means of transportation as well as healthy forms of physical activity. Increasingly, we want our neighborhoods and communities to be safe and appealing places to bicycle and walk. We want them to be "livable," with destinations that can be reached other by traveling in our cars on congested streets and highways.

In the late summer and fall of 2000, the North Carolina Department of Transportation's Division of Bicycle and Pedestrian Transportation (DBPT) undertook a survey to learn more about current levels of bicycling and walking in the state and ways to encourage more people to ride or bike. The survey was designed and conducted by researchers at the University of North Carolina Highway Safety Research Center.

Prior to this survey, the last statewide survey of bicycling had been conducted in November of 1977 by the then recently established North Carolina Bicycle Program. The 1977 survey incorporated both telephone and in-person interviews with individuals in just over 1,000 households. Over half (54%) of the participating households reported owning bicycles.

Much has changed over the two-plus decades since the 1977 North Carolina Bicycle Survey. The NC DOT Bicycle Program has evolved into the Division of Bicycling and Pedestrian Transportation, and nationally as well as locally bicycling and walking have come to be viewed as essential components to a balanced transportation system. In addition, the highway safety and health communities have joined in promoting bicycling and walking as two activities that can contribute to an active and healthy lifestyle.

The goal of the current project was to provide an updated "snapshot" of the status of bicycling and walking in North Carolina. How many North Carolinians bike or walk regularly? Where do they bike and walk? Do people feel that their neighborhoods and communities are good places for bicycling and walking? What changes would make bicycling and walking easier and safer for North Carolinians? Answers to these and other questions can help guide the DBPT in its mission of creating safer and more attractive environments for bicycling and walking in North Carolina.

Survey Methodology

Questionnaire Development

A telephone questionnaire was developed by researchers at the University of North Carolina Highway Safety Research Center, in collaboration with DBPT staff. The 1977 survey served as a starting point for identifying potential questions, although the updated survey was much broader in scope. Another major difference between the two surveys was that in 1977 one adult family member was asked to provide information on bicycling by *all* members of the household, whereas in the current survey, information was limited primarily to the participating adult. In addition to including more questions on bicycling, the current survey also included parallel questions on walking.

The telephone questionnaire was developed over a period of several months during the spring and early summer of 2000. It was reviewed by professional survey staff at the UNC Institute for Research in Social Science, and was pilot tested in both informal and formal settings. A copy of the final questionnaire is included in Appendix A. The survey was designed to gather information on the following topics:

- Household characteristics - number of persons residing in household, number of bicycles owned by members of household, etc.
- Bicycling frequency, reasons for riding (commuting, exercise, errands, etc.), reasons for not riding more often, and preferred locations for riding
- Ownership and use of bicycle helmets by self and by any children in household
- Recent involvement in bicycle crashes
- Walking frequency, reasons for walking, preferred locations for walking
- Children's school travel
- Improving neighborhood and community conditions for bicycling and walking
- Opinions on issues related to bicycling and walking
- Participant demographics

For someone who rode a bicycle and who had school-age children in the household, the survey was timed to take about 15 minutes to complete. For non-riders and households without children, the completion time was considerably shorter.

Survey Sample

The sampling frame for the survey consisted of a random digit dial (RDD) listing of telephone numbers for North Carolina, purchased from a national marketing firm (Genesys Sampling Systems, Marketing Systems Group, Fort Washington, PA). The numbers were screened by the provider to help eliminate non-working, disconnected, and business numbers. In addition, HSRC requested that the listed telephone numbers be matched to available addresses and names. From an initial purchased listing of 5,500 numbers, 3,848 (70.0%) passed the screening process, and of these, 2,137 (55.5%) had associated names and addresses. Having names and addresses allowed us to send prior notification of the survey to these households. However, to avoid biasing the RDD sample, both households with and without names and addresses were contacted to participate in the survey. Once a household was contacted, an interview was attempted with either the person identified on the file, if available, or with the adult in the household who most recently had a birthday.

Data Collection

Data were collected over a 3-month period beginning the third week of August, 2000 and extending through the third week of November. The telephone interviews were conducted by trained employees of the UNC Highway Safety Research Center. Although some calls were made during normal work hours, the vast majority were made on weekday evenings and on weekends. If name and address information was available, a notification letter was mailed a few days prior to attempting to reach a particular individual by telephone (see Appendix B for a copy of the letter). Otherwise, "cold calls" (without prior notification) were made to a household and interviewers were instructed to ask for the adult (age 18 or above) in the household who most recently had a birthday.

Completion Status of Survey Sample

To reach the targeted number of 1,000 completed surveys, 70% (2,683 of 3,848) of the available sample of RDD numbers was used. Table 1 provides a breakdown of the completion status for this sample. Despite the prior screening, 16.8% of the sample was lost due to non-working telephone numbers (primarily numbers that had been disconnected or were no longer

in service); 4.7% were found to be business numbers, and 2.8% were fax machine numbers. In addition, 5.1% of the sample was not used because the specific individual we were trying to contact no longer lived at the address.

Along with invalid telephone numbers, the other primary source of loss to participation was not being able to contact a particular household or individual. In 15.8% of the cases, no contact was able to be established despite multiple call attempts. Oftentimes only an answering machine was reached. In an additional 6.5% of cases, 1-3 call attempts were made prior to reaching the targeted number of completed interviews and ending the survey.

In all, there were 206 refusals to participate among the households contacted. The overall survey cooperation rate, defined as the number of completions divided by the number of completions plus refusals (1000 / (1000 + 206)), was 82.9%.

Table 1. Completion status of survey sample

Completion Status	N	%
Completed interview	1,000	37.3
Non-working number (disconnect, not in service, number blocked, etc.)	450	16.8
Business number	125	4.7
Fax machine or cell phone	74	2.8
Incorrect number (for cases with names attached)	137	5.1
Deceased	24	0.9
Language barrier	24	0.9
Person not available (moved, military, etc.)	23	0.9
Physical barrier (ill, hard of hearing, dementia, etc.)	17	0.6
Ineligible (under age 18, out-of-state visitor, etc.)	3	0.1
Refused	206	7.7
Unable to contact (5+ contacts attempted)	425	15.8
Unknown (1-3 contacts attempted)	175	6.5
TOTAL	2,683	100.0

Participant Characteristics

Table 2 provides demographic information for the survey participants. Males and females were about equally represented in the survey sample, at 49.1% and 50.9%, respectively. The mean age of survey participants was 47.6 years and the median age was 45 years. One in five participants was of a minority population, with most of these being African American. Nearly ninety percent were high school graduates, and a third were college graduates.

Table 2. Demographic characteristics of survey participants (N=1,000)

Participant Characteristics		N	%
Age	18-29	159	16.4
	30-39	219	22.6
	40-49	197	20.3
	50-59	136	14.0
	60-69	132	13.6
	70+	128	13.2
	Unknown	29	-
Gender	Male	485	49.1
	Female	502	50.9
	Unknown	13	-
Race	White	771	78.8
	African American	163	16.7
	Hispanic	10	1.0
	Asian	9	0.9
	American Indian	9	0.9
	Other	17	1.7
	Unknown	21	-
Education	Less than high school	111	11.5
	High school graduate	314	32.6
	Post high school graduate	220	22.9
	College graduate	218	22.6
	Post college education	29	3.0
	Graduate degree	71	7.4
	Unknown	37	-
Household Income	$15,000 or less	81	10.2
	$15,001 - $30,000	169	21.3
	$30,001 - $50,000	236	29.8
	$50,001 - $75,000	168	21.2

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(Contd) Table 2. Demographic characteristics of survey participants (N=1,000)

Participant Characteristics		N	%
Household Income (contd)	$75,001 - $100,000	78	9.8
	Greater than $100,000	61	7.7
	Unknown	207	-
Living Environment	Rural area	308	32.0
	Small city or town (less than 25,000)	256	26.6
	Medium city or town (less than 75,000)	186	19.3
	Larger city (greater than 75,000)	212	22.0
	Unknown	38	-

Compared to the overall North Carolina population age 18 and above, there was a smaller percentage of young survey participants and a larger percentage of older survey participants (Table 3). Minority populations were also somewhat underrepresented. Although specific percentages were not available for the population age 18 and above, the overall North Carolina population is 73.3% white, 22.0% African American, and 4.7% other (U.S. Census, 2001). These differences are likely attributable to the greater difficulty in reaching the younger and minority populations.

Table 3. Age and sex distribution of North Carolina population aged 18 and above (U.S. Census, 2001).

Characteristic		%
Age	18-29	21.8
	30-39	21.1
	40-49	20.1
	50-59	14.8
	60-69	10.3
	70+	11.9
Gender	Male	47.6
	Female	52.4

Analysis and Report Presentation

Completed survey questionnaires were reviewed and edited prior to entering the data into a SAS database for analysis. The analysis was primarily descriptive and involved single variable and two- and three-way cross-tabulations of the data. Since there were slight differences in the age and gender distributions of the survey sample and the overall North Carolina population estimates, individual variables were examined to determine whether they varied significantly across levels of these variables. If they did, then response distributions were presented within levels of the variable and/or the responses were weighted to reflect the estimated North Carolina population age 18 and above. In actuality, the weighting process produced only slight changes to the raw survey estimates.

The survey findings are organized into four sections:

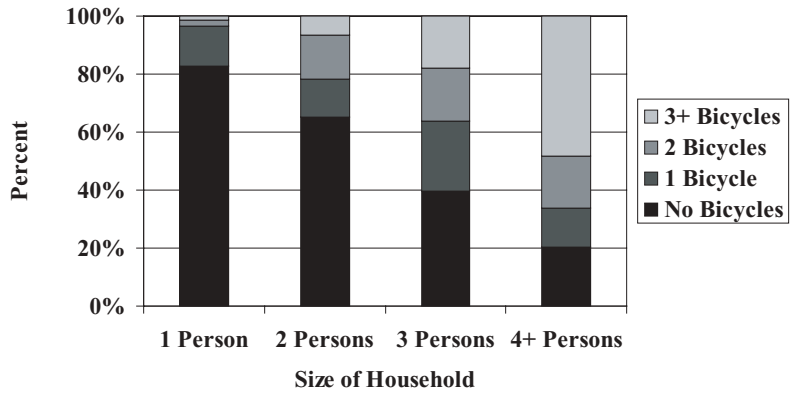
- Bicycling in North Carolina
- Walking in North Carolina
- Opinions on issues related to bicycling and walking
- Comments and suggestions for encouraging bicycling and walking.

Text has been kept to a minimum, and the results primarily presented using figures and tables along with accompanying descriptive captions and summaries.

Bicycle Ownership and Use

Overall, 46.0% of respondents reported one or more bicycles in the household. Bicycle ownership was strongly associated with size of household: whereas only 17.3% of single person households owned one or more bicycles, 33.1% of two-person, 60.4% of three-person, and 79.5% of four or more person households owned bicycles. The *number* of bicycles owned also increased with size of household (Figure 1). These results likely reflect the greater use of bicycles by children.

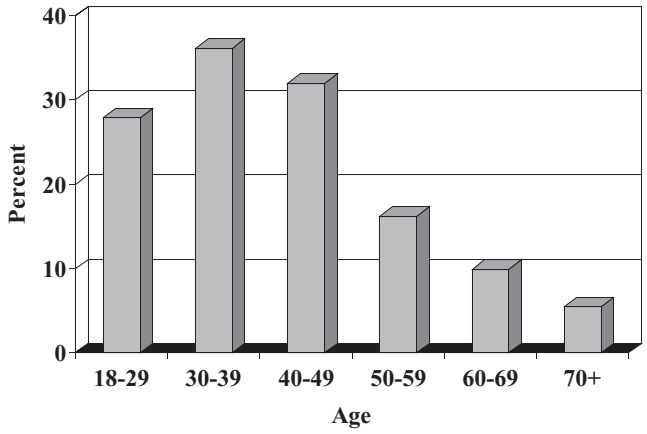
Figure 1. Number of bicycles owned by size of household.



Not surprisingly, bicycle ownership increases with size of household. 80% of households with 4 or more members own bicycles.

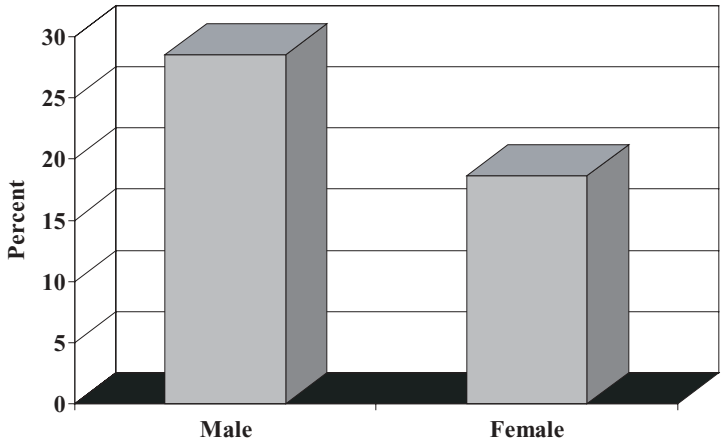
Just over a third (34.0%) of the adults age 18 and older interviewed said that they themselves owned a bicycle, and 23.3% reported riding within the past 12 months. These results were associated with both age and sex (Figures 2 and 3). Overall, 28.5% of males and 18.6% of females reported riding during the past 12 months ($p < .001$). The group with the highest percentage of bicyclists was males ages 40-49, followed closely by males ages 30-39 (Figure 4). Among females, ridership was highest among 30-39 year-olds. Even though younger adults were underrepresented in the survey and older adults overrepresented, weighting the results by age and sex to better reflect the overall NC population produced only a slight increase in the overall percentage of riders: from 23.3% to 24.1%.

Figure 2. Percent riding in past 12 months by age.



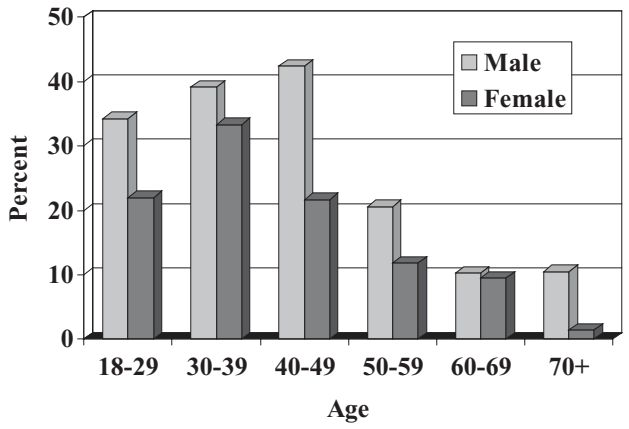
30-39 and 40-49 year-olds were the most likely to have bicycled in the past 12 months.

Figure 3. Percent riding in past 12 months by sex.



Males were 1 1/2 times more likely than females to have bicycled in the past 12 months.

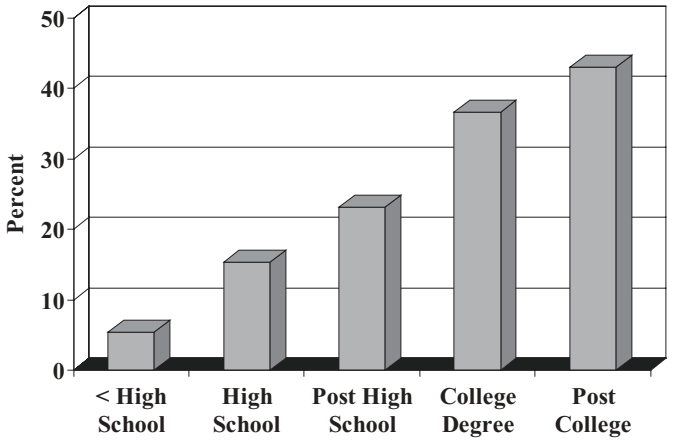
Figure 4. Percent riding in past 12 months by age and sex.



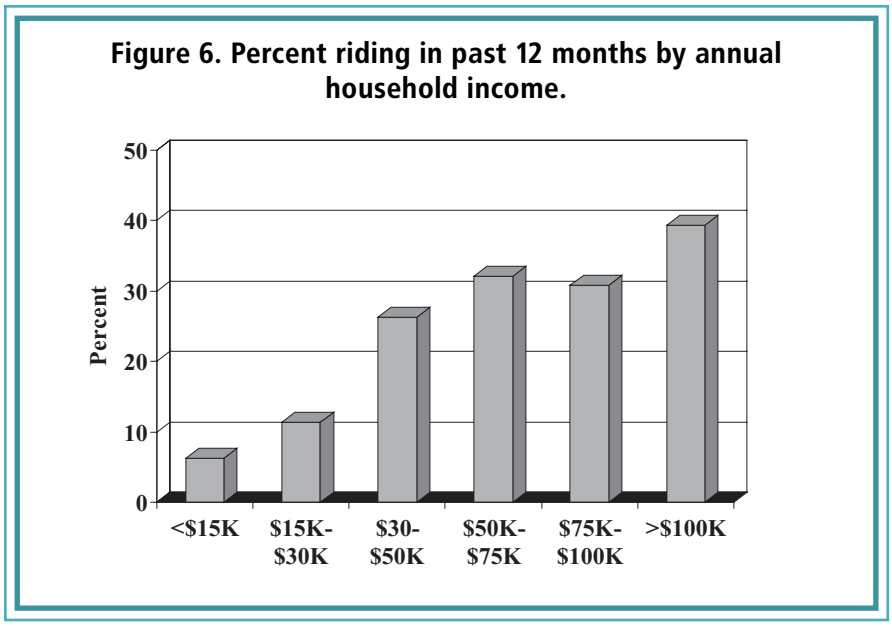
Bicycling was most popular among adults under age 50 and among males.

Other demographic variables were also found to be associated with bicycle rider status. In particular, those adults who had ridden within the past year tended to be better educated, have higher household incomes, and were more likely to be white (Figures 5-7). Although persons living in rural areas were less likely than those living in small towns or larger urban centers to have ridden a bicycle in the past year, the difference was not statistically significant.

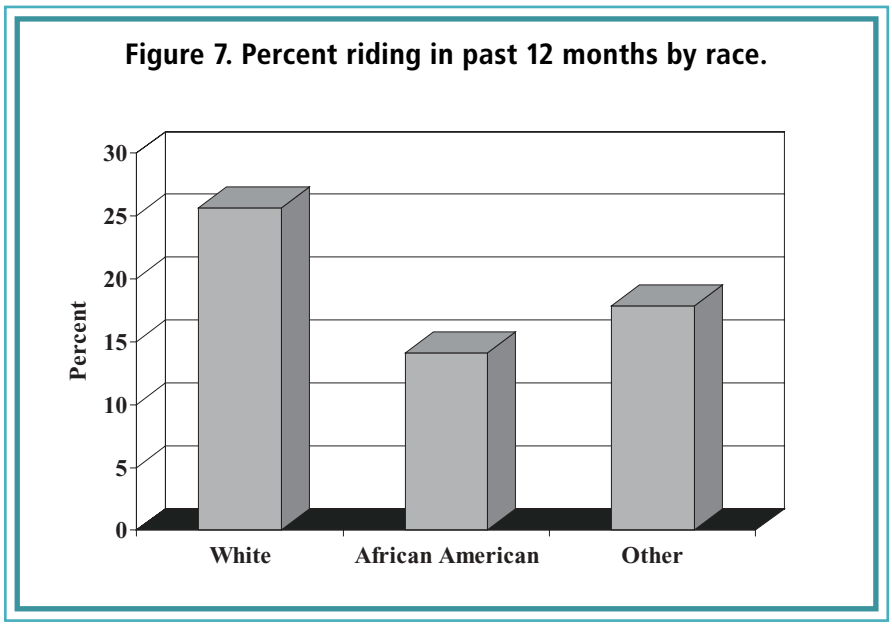
Figure 5. Percent riding in past 12 months by education level.



Bicycle riding increases with education level — more than 40% of those with post college degrees had ridden in the past 12 months.

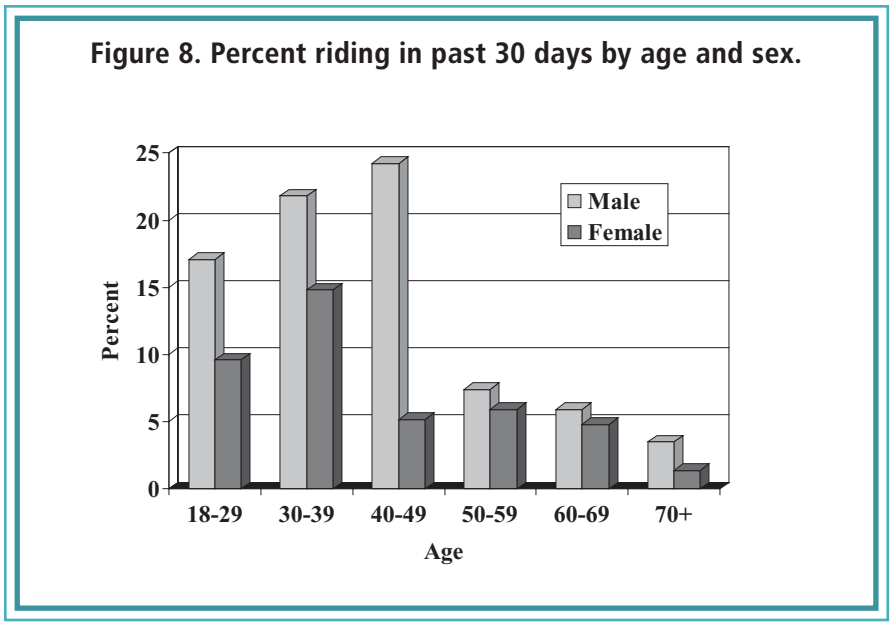


Less than 10% of persons with incomes less than $30,000 a year had bicycled in the past 12 months, compared to nearly 40% of those with incomes greater than $100,000.



More whites ride bicycles than African Americans or other racial groups.

Of those bicyclists who had ridden within the past year, nearly half (48.7%) had also ridden within the past 30 days. Altogether, 111 adults, or 11.1% of those interviewed, had ridden a bicycle within the past 30 days. These results also varied significantly by the various demographic characteristics reported above (Figure 8).



Females ride less than males in all age groups; the difference is especially evident for 40-49 year-olds.

Reasons for Riding and Not Riding

The 111 adults who reported riding during the past 30 days were asked how often they rode for various reasons. Not surprisingly, the reason generating the greatest response was simply riding for fun or exercise: nearly a fourth (22.7%) of the respondents said that they rode for fun or exercise every day or almost every day, and an additional 50.0% said that they did so at least once a week (Figure 9). Riding for social or recreational trips (for example, riding to a friend's house or to a park) produced the next strongest response. Clearly there could be some overlap here, in that social or recreational trips can also involve fun and exercise, and vice versa. Nearly one in 12 (7.9%) of those who had ridden in the past 30 days reported commuting to work by bike on at least one occasion, and one in five (18.0%) reported using their bike to run errands.

The reason most frequently given for *not* commuting to work by bicycle was that the work location was too far away, or that it would take too long to get there: these responses were offered by over two-thirds (68.4%) of those who worked and who had ridden a bicycle in the past 30 days. Safety related reasons were given by 17.9% of the respondents and included "too much traffic" and a lack of bike lanes along the route. An additional 6.3% gave more practical reasons for not riding their bicycles to work, including the need to drop off children, run errands, and carry things, as well as the weather and arriving at work hot and sweaty. For traveling places other than to work, the main reasons for not riding one's bike were again either distance and time related (40.7%) or safety related (34.1%).

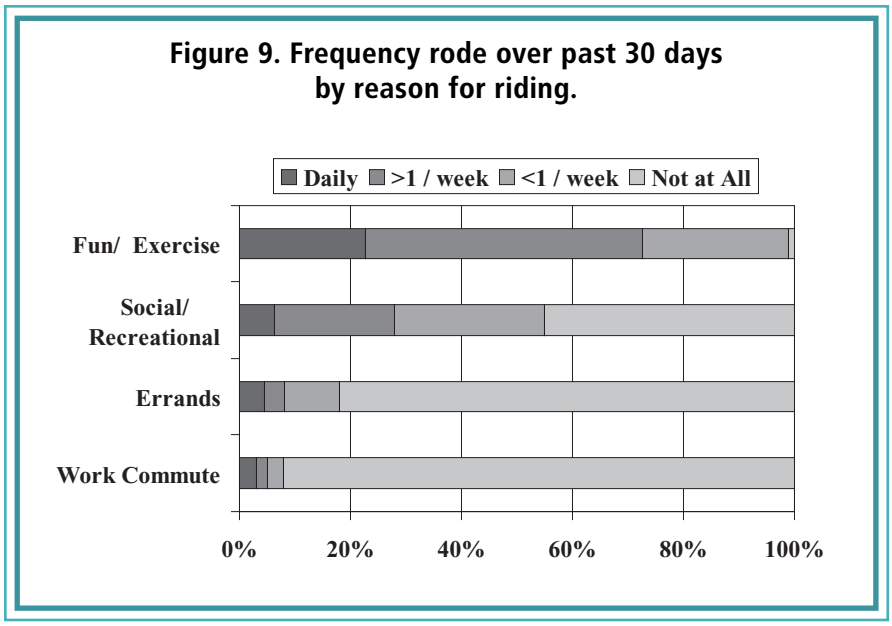


Figure 9. Frequency rode over past 30 days by reason for riding.

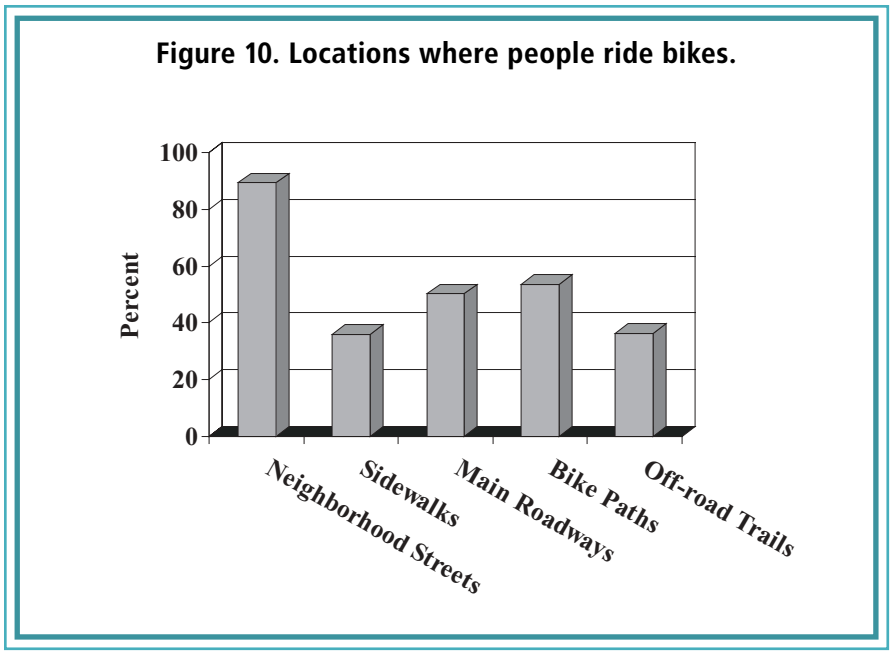
While fun/exercise was the main reason given for bicycling, 18% of riders had used their bike for running errands and 8% for commuting to work.

Where Bicycles Are Ridden

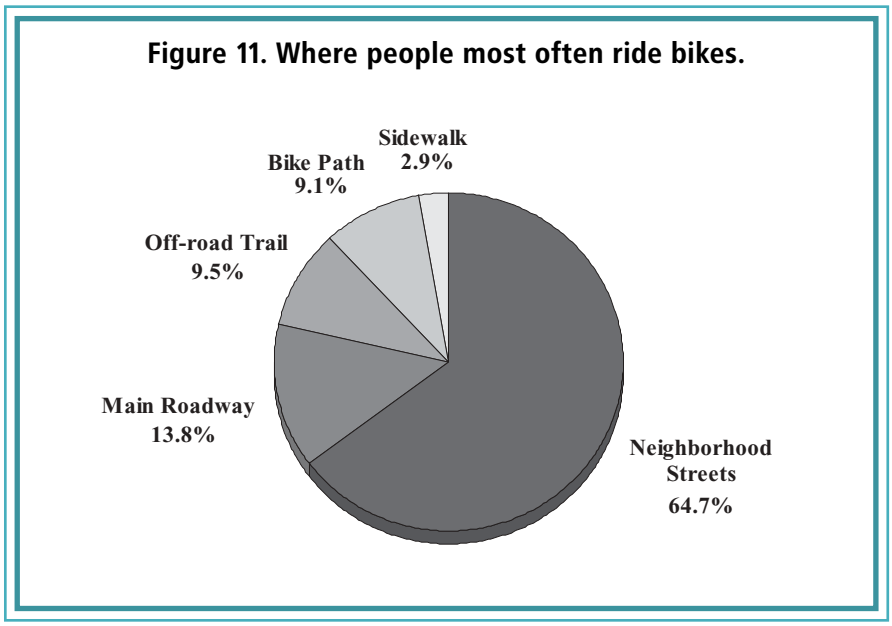
All who had bicycled in the past 12 months were asked about the locations where they rode. The vast majority (89.4%) reported riding on neighborhood streets, and over half (53.6%) said that they rode on bicycle paths or greenways (Figure 10). Almost as many (50.2%) reported riding on main roadways with traffic. Smaller, but still substantial numbers, reported riding on off-road trails (36.3%) or on sidewalks (35.8%). These percentages do not take into consideration the availability of these various places for riding. When asked where they *most often* rode, neighborhood streets was cited by nearly two-thirds (64.7%) of the respondents, followed at some distance by main roadways (13.8%), off-road trails (9.5%), and bicycle paths or greenways (9.1%). Less than 3% reported riding most often on sidewalks (Figure 11).

The only significant age differences in these findings were that younger adults (ages 18-29) were almost twice as likely as other age groups to report riding on off-road trails, whereas older adults (age 60+) were less likely to ride on off-road trails as well as on bicycle paths or greenways. With regard to gender, males were more likely than females to report riding on main roadways with traffic (57.0% versus 40.5%, $p = .02$).

One-third (33.6%) of those who had ridden a bicycle in the past 12 months had also ridden while on a trip or vacation. There were no significant age differences, although males were more likely than females to have ridden on a trip or vacation (38.8% versus 26.5%, $p = .05$). Half (50.0%) of the 24 males ages 18-29 had ridden while vacationing during the past 12 months.



Nearly 90% of adults ride on neighborhood streets, and half ride on main roadways and bike paths.



Almost two-thirds of adults surveyed indicated that they rode most often on neighborhood streets.

Bicycle Crashes and Falls

Eleven individuals, or just under five percent of those who had ridden in the past 12 months, reported crashing or falling during that time. Most of these incidents occurred on off-road trails and involved no other vehicles. None resulted in injuries serious enough to require medical attention.

Improving Conditions for Bicycling

All survey participants were asked to identify any changes or improvements that would make it easier or safer for people to bicycle in their own neighborhood, as well as beyond the immediate neighborhood or area where they lived. These results are summarized in Tables 4 and 5. A large percentage (44.2%) of the survey participants indicated either that no improvement was needed or they could not think of any specific improvement that would make bicycling easier or safer in their neighborhood. The most frequently cited improvements were adding bicycle lanes or sidewalks, which together were noted by over a fourth of the survey participants. Reducing traffic, widening streets, and adding off-road paths or greenways were each cited by five to seven percent of the respondents. The "other" category in the table includes such things as educating motorists, trimming bushes, reducing crime, and making the roads less hilly.

In these responses, there were some differences between those who had ridden and those who had not ridden bicycles in the past year. In particular, bicyclists were less likely than non-bicyclists to say that no improvement was needed (37.0% versus 46.4%), and they were more likely to suggest specific bicycle facility improvements such as adding bike lanes (19.4% versus 12.3%) or off-road trails or greenways (7.0% versus 4.1%).

Table 4. Suggestions for making it easier or safer to bicycle *within* the neighborhood.

Suggested Improvement	N[1]	%
Nothing needed / can't think of anything	425	44.2
Add bicycle lanes	134	13.9
Add sidewalks	119	12.4
Reduce amount of traffic	68	7.1
Widen streets	64	6.7
Add off-road paths or greenways	46	4.8
Repair pavement	17	1.8
Add traffic signals	10	1.0
Increase police enforcement	9	0.9
Add paved shoulders	8	0.8
Add speed bumps	7	0.7
Pave roads	7	0.7
Add signs to watch for peds/bikes	7	0.7
Control dogs	7	0.7
Add street lights	6	0.6
Other	27	2.8
TOTAL	961	99.8

[1] Missing, unknown, and not applicable responses omitted.

While nearly half of respondents felt no improvements were needed, more bicycle lanes and sidewalks were frequently recommended.

Table 5. Suggestions for making it easier or safer to bicycle *outside* the neighborhood.

Suggested Improvement	N[1]	%
Nothing needed / can't think of anything	375	43.0
Add bicycle lanes	159	18.2
Add sidewalks	101	11.6
Widen streets	69	7.9
Add off-road paths or greenways	42	4.8
Reduce amount of traffic	37	4.2
Add paved shoulders	12	1.4
Educate motorists (about sharing road, etc.)	12	1.4
Improve street design	12	1.4
Add traffic signals	9	1.0
Add signs to watch for peds/bikes	6	0.7
Increase enforcement	6	0.7
Other	32	3.7
TOTAL	872	100.0

[1] Missing, unknown, and not applicable responses omitted.

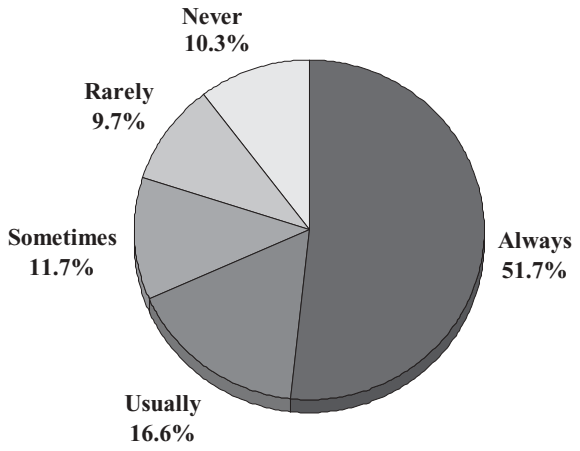
Adding bicycle lanes was the top recommendation for improving conditions outside the neighborhood.

The overall pattern of responses was similar with regard to improving conditions for bicycling outside the immediate neighborhood, although with a smaller percentage of "nothing needed" responses (Table 5). Bicycle lanes and sidewalks were again the most frequently cited improvements, along with wider streets and adding off-road paths or greenways. Similar to above, non-bicyclists (those who had not ridden in the past year) were more likely than bicyclists to claim that nothing was needed or that they could not think of anything needed. Non-bicyclists were also more likely to decline to answer the question, saying that they did not know about bicycling needs beyond their neighborhood. Those who had ridden within the past year were especially likely to identify bicycle lanes (29.4%) and off-road trails or greenways (8.1%) as needed improvements.

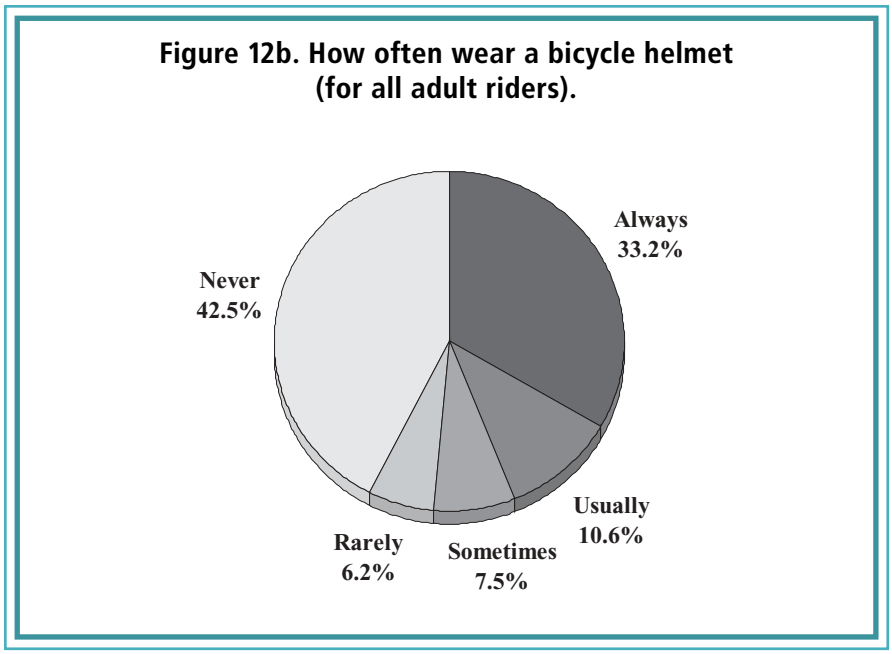
Bicycle Helmet Use

Nearly two-thirds (64.2%) of the adults ages 18 and above who had ridden during the past year reported owning a bicycle helmet or having access to one that they could use. Just over half of helmet owners, however, said that they always wore their helmet when they rode, while one in five reported rarely or never wearing their helmet (Figure 12a). Adding in the one-third of riders who do not have a helmet reduces the percentage of self-reported "always" wearers to 33.2%, while increasing the percentage of "never" wearers to 42.5% (Figure 12b). Helmet ownership and use were not significantly associated with age, gender or race, although whites were somewhat more likely than nonwhites to report owning (65.8% versus 51.7%) and always wearing (54.3% versus 33.3%) a bike helmet.

Figure 12a. How often wear a bicycle helmet (for adult riders who report having a helmet).



Just over half of adults who have a helmet report always wearing it when they ride.



Overall, a third of all adult riders report always wearing a helmet.

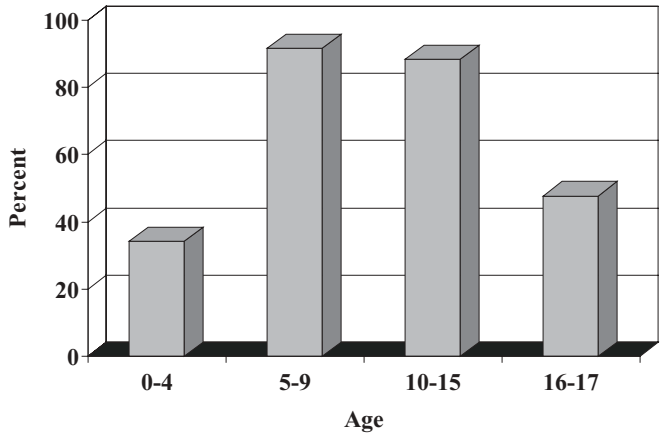
Children's Riding and Helmet Use

Nearly a third (31.1%) of the adults interviewed had children under the age of 18 living in the household. Altogether there was a total of 503 children for whom information was available on age and bicycle riding habits; 360 of these, or 72%, were reported to ride bicycles. Ridership was highest among 5-15 year-olds, with over 90% of the children in this age group reported to ride bicycles (Figure 13).

Overall it was reported that 82.9% of the children under the age of 18 who rode bicycles also owned or had access to a bicycle helmet. Children ages 5-9 were the most likely to own a helmet, followed by those ages 10-15. Only two-thirds (65.6%) of children ages 16-17 were reported to own a bicycle helmet (Figure 14).

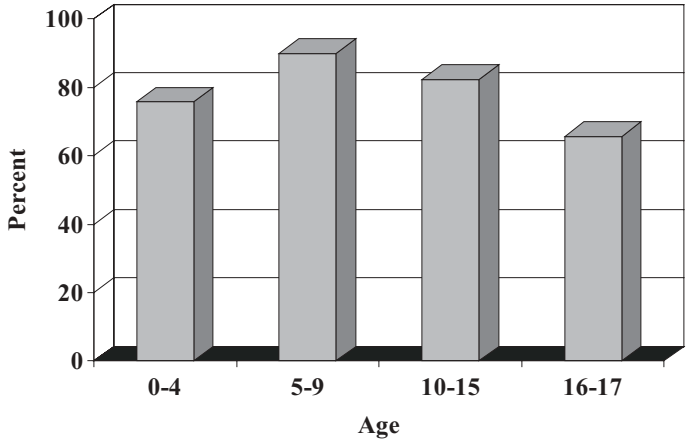
For those children who were reported to ride bicycles and to own a helmet, just over half were said to always wear the helmet when they rode, and an additional 17.1% to usually do so (Figure 15). Again, use rates varied by age, but in this case the 10-15 year-old riders were the least likely to be reported to always wear a helmet (Figure 16).

Figure 13. Percent of children who ride a bicycle, by age of child.



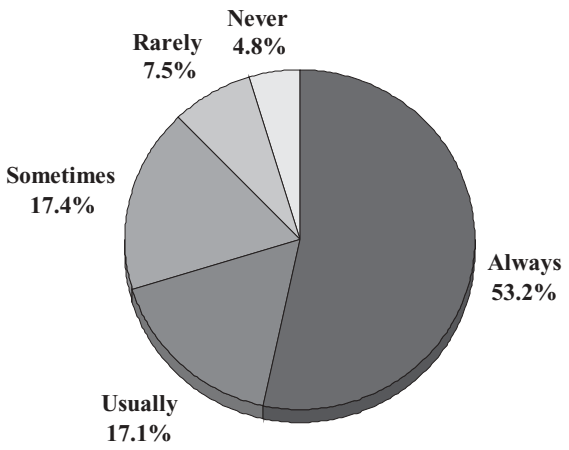
Bicycle riding is especially common for children ages 5-15.

Figure 14. Percent of children who bicycle who are reported to own or have access to a helmet.



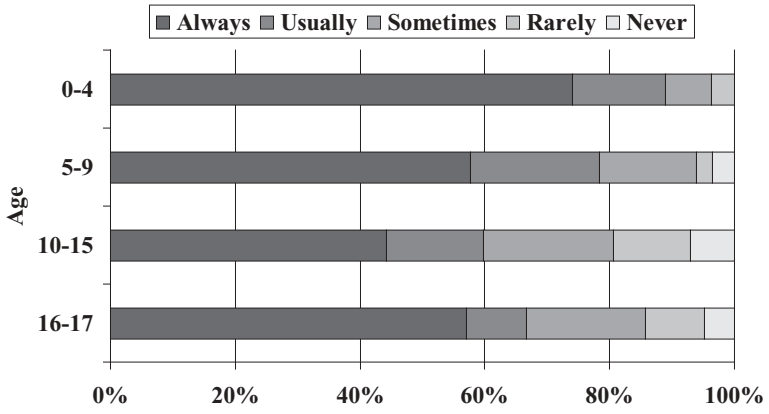
Parents reported a high percentage of children having helmets.

Figure 15. How often wear a bicycle helmet (for children under age 18 owning a helmet).



Only half of those children with helmets were reported to always wear them when they rode.

Figure 16. Reported helmet use by those children owning a helmet, by age of child.

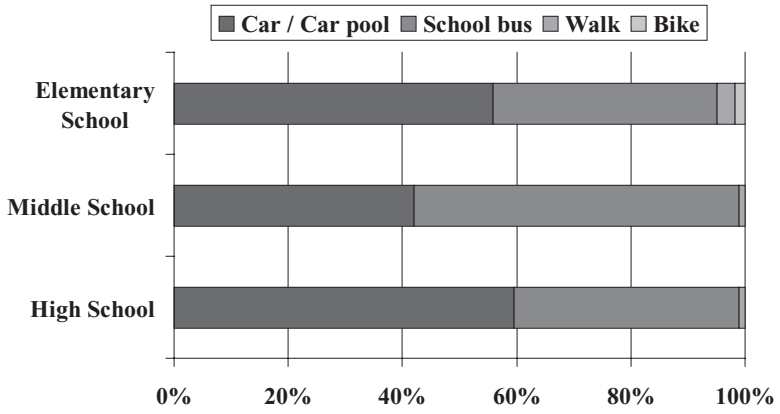


Reported helmet use was lowest among 10-15 year-old riders.

Children's Travel to School

Households with children were also asked to provide information on how these children traveled to school. Altogether there were 356 children who attended school: 163 elementary, 88 middle, and 105 high school. The most frequent mode of transport to school was the private automobile, used by 53.5% of the children. This was followed by school buses, used by 43.7%. Only 7 (2.0%) of the respondents said that their child walked to school, and 3 (0.8%) biked. Middle school age children were the most likely to ride a school bus, but the differences among the school levels were not statistically significant (Figure 17).

Figure 17. Children's mode of transport to school.



Very few children walk or bike to school; most ride in cars or school buses.

When asked why their child did not walk or ride a bicycle to school, the reason most often given was that the school was too far away (64.2% of respondents). But a variety of safety-related reasons were also cited: walking and bicycling were too dangerous, there were no sidewalks or no crossing guards at street intersections, fear of crime, etc. (Table 6).

Table 6. Reasons for children not bicycling or walking to school.

Reason Given by Parent / Adult	N	%
School too far away	228	64.2
Too dangerous	49	13.8
Parent / adult doesn't want child to	19	5.4
Fear of crime	12	3.4
Child doesn't want to	8	2.3
No sidewalks	6	1.7
No crossing guards	6	1.7
Easier to drive	4	1.1
Too much to carry	3	0.8
Other	20	5.6
TOTAL	355	100.0

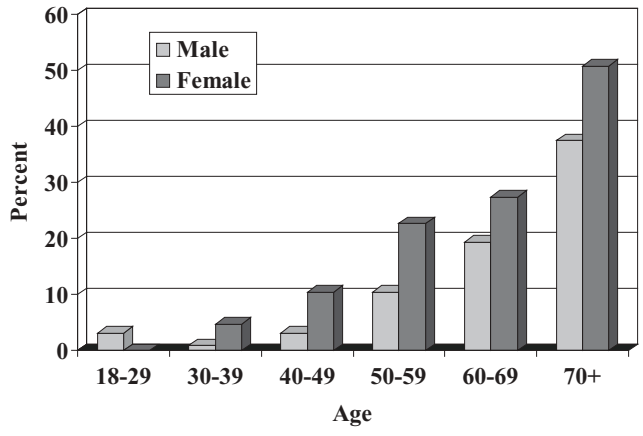
Most children don't bicycle or walk to school because it's too far away, but safety is also an important concern for parents.

Restrictions on Walking

Prior to asking the survey questions about walking, all participants were asked whether they had any physical limitations that restricted the amount of walking they were able to do. If they indicated that they did, a follow-up question was asked to clarify whether the physical limitation "somewhat restricted" or "severely restricted" their ability to walk. Those who indicated that their walking was severely restricted were not questioned further about their walking activity.

Overall, 13.9% of the survey participants indicated that they had physical limitations that severely restricted their ability to walk. Not surprisingly, this percentage was strongly associated with age: older respondents were much more likely than younger respondents to report limitations that restricted their walking ($p < .001$). In addition, regardless of age, females were more likely than males to report severe limitations ($p < .001$) (Figure 18).

Figure 18. Percent reporting physical limitations severely restricting their ability to walk.



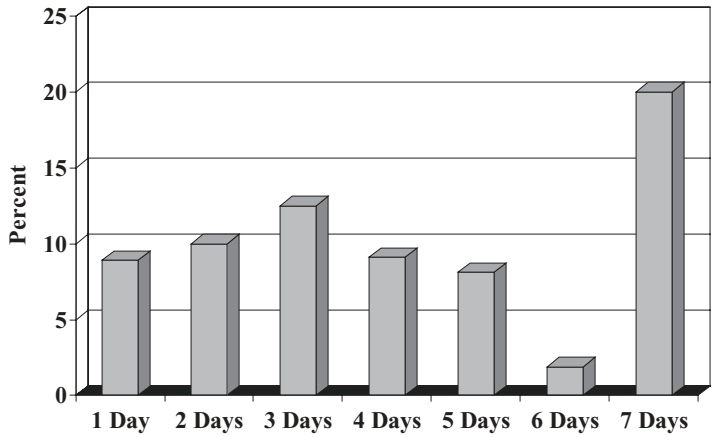
Walking limitations increased with age, and were more common among women than men.

The sections that follow draw from the responses of the 861 survey participants who did not report having severe physical limitations that restricted their ability to walk places.

How Often Walk and for How Long

In responding to the survey questions about walking, participants were instructed to *"consider any walking you do outside, whether on streets, sidewalks, or on paths."* Using this definition of walking, just over 70 percent of the respondents (those whose physical activity was not severely restricted) said that they had walked distances of two blocks or more on at least one day out of the past seven; one in five (20.0%) had walked two or more blocks on all seven days (Figure 19).

Figure 19. Number of days walked out of the past seven days.



One in five persons had walked all seven of the past seven days.

Age was significantly associated with walking activity during the past seven days ($p < .001$). While younger adults were the most likely to have walked at least one out of the past seven days, older adults age 50 and above were the most likely to have walked all seven days (Figure 20). In addition, even though females and males were about equally likely to have walked on at least one day (71.7% of males, 69.2% of females), males were more likely to have walked on all seven days (24.8% versus 15.4%, $p = .06$) (Figure 21). Males had walked an average of 3.2 days the previous week, while females had walked an average of 2.7 days ($p = .01$).

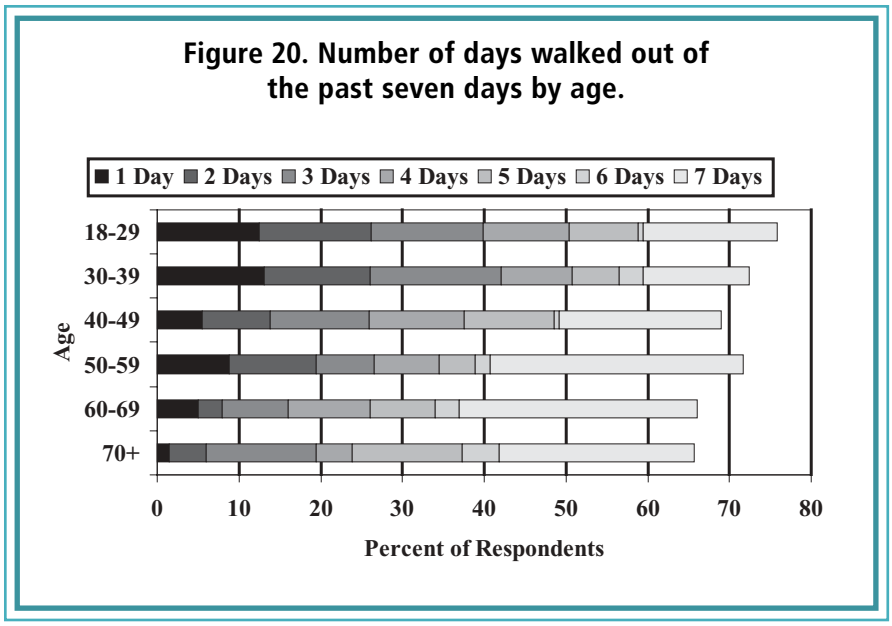


Figure 20. Number of days walked out of the past seven days by age.

Although younger adults were more likely to have walked on at least one of the past seven days, those age 50 and above had walked the most days.

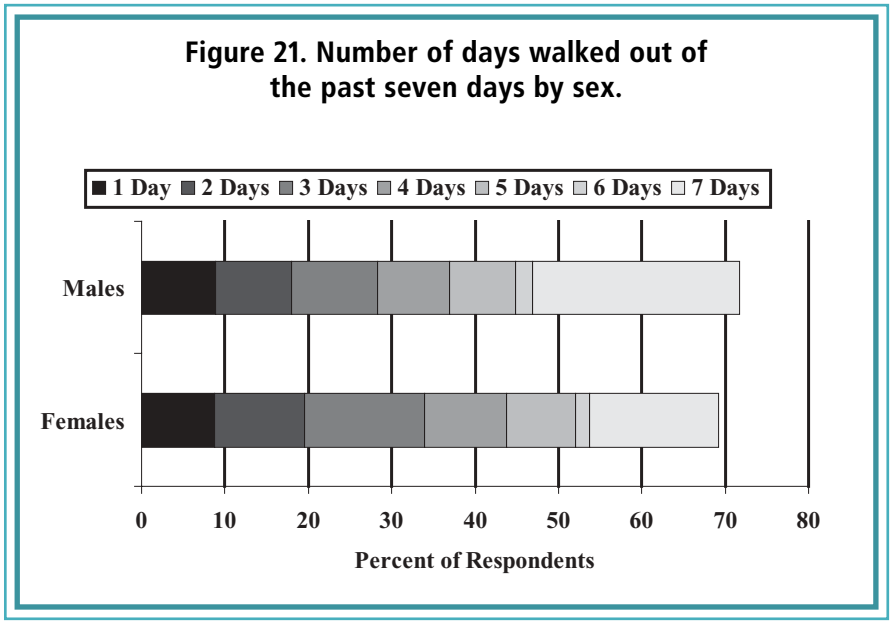


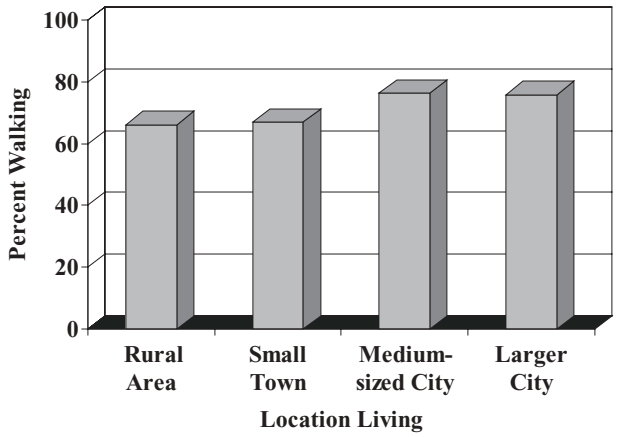
Figure 21. Number of days walked out of the past seven days by sex.

Male and female walking patterns are similar, although males were somewhat more likely to report walking on all seven of the past seven days.

There were also other demographic differences in walking patterns. Respondents living in rural areas or in small towns (<25,000 population) were less likely to report that they had walked during the past seven days than those living in medium sized or larger cities (Figure 22, $p = .03$). Education level and household income were also associated with walking activity. Generally, the more educated a respondent was, the more likely he or she was to have walked during the past week (Figure 23, $p < .01$). The relationship with income was less straightforward,

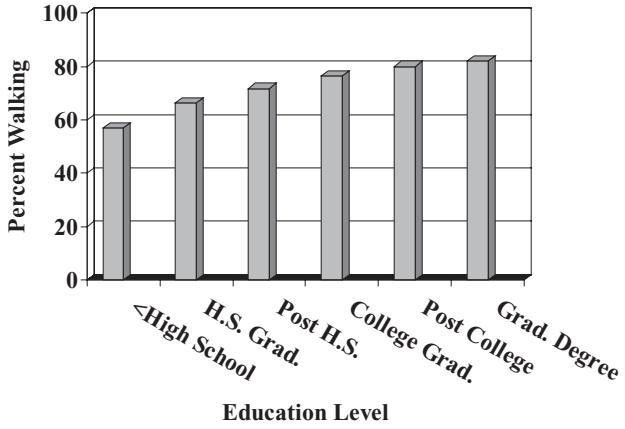
with higher percentages of walkers in both the lowest (under $15,000) and highest (over $75,000) income groups (Figure 24, $p < .01$).

Figure 22. Percent walking one or more of past seven days by location where live.



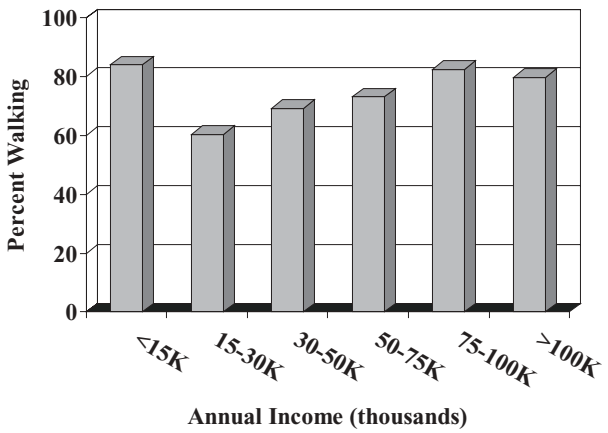
Persons living in medium or larger sized cities were more likely to walk than those living in smaller towns or rural areas.

Figure 23. Percent walking one or more of past seven days by level of education.



In general, the higher the level of education, the more likely a person was to have walked in the past week.

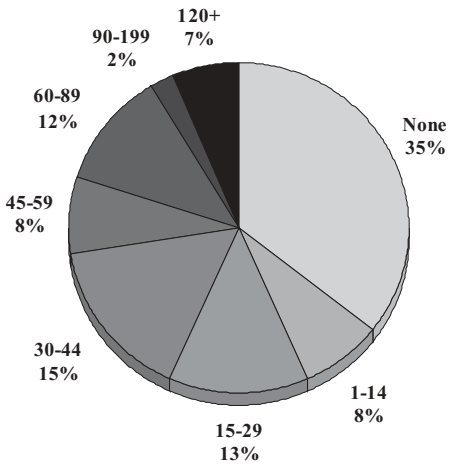
Figure 24. Percent walking one or more of past seven days by annual household income.



Persons with higher household incomes and those with incomes less than $15,000 per year were the most likely to have walked in the past week.

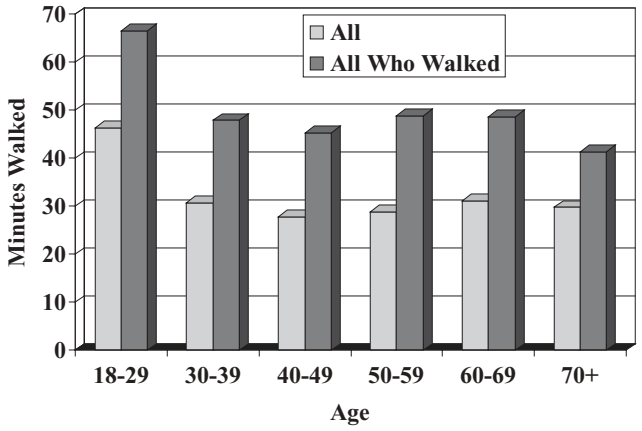
The 811 respondents were also asked how much time, altogether, they had spent walking on just the previous day. Over half (56.5%) reported walking for 15 or more minutes (Figure 25). Altogether, the respondents reported spending an average of 32.6 minutes walking on the previous day. This number includes those respondents who had not walked at all. If these non-walkers are excluded, the mean time spent walking among those who had walked at all was 50.2 minutes. There were no differences in times for males versus females, but times were highest for the 18-29 year-old age group (Figure 26).

Figure 25. Minutes walked on the previous day.



Two-thirds of adults had walked on the previous day; 44% had walked for 30 minutes or more.

Figure 26. Minutes walked on the previous day by age.

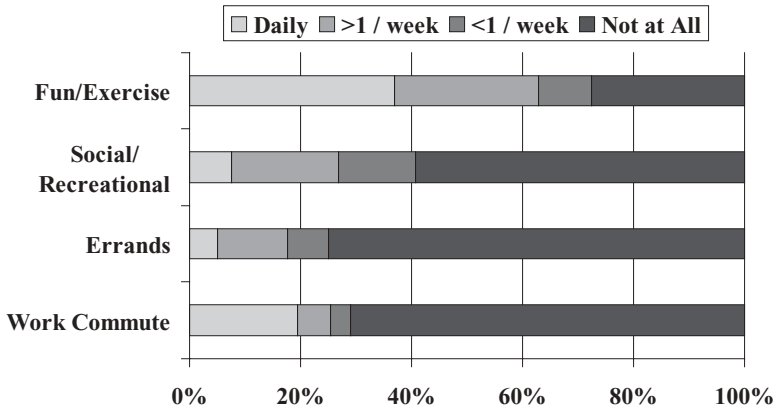


Although 18-29 year-olds reported walking the most, time spent walking was fairly consistent across all age groups.

Reasons for Walking

Respondents (those without severe disabilities) were asked how often over the past 30 days they had walked two or more blocks outside for various trip purposes, such as commuting to work or for fun and exercise. These results are summarized in Figure 27. As was the case for bicycling, respondents were most likely to walk for fun and/or exercise: nearly two-thirds of the respondents walked for fun or exercise at least once a week, and 37.0% did so every day or almost every day. Over a fourth (27.2%) walked for social or recreational trips (to a friend's house, the park, the movie theater, etc.) at least once a week, and 17.7% walked at least once a week to shop, go to the bank, or run other errands. Nearly one in five (19.4%) walked distances of two blocks or more as part of their work commute; however, only 20 respondents, or 2.9% of all those who worked outside the home, walked as their primary means of traveling to and from work on one or more days per week. Other reasons for walking that were mentioned by the respondents were walking to class or school, walking as part of their job, and hunting.

Figure 27. Frequency walked over past 30 days by reason for walking.



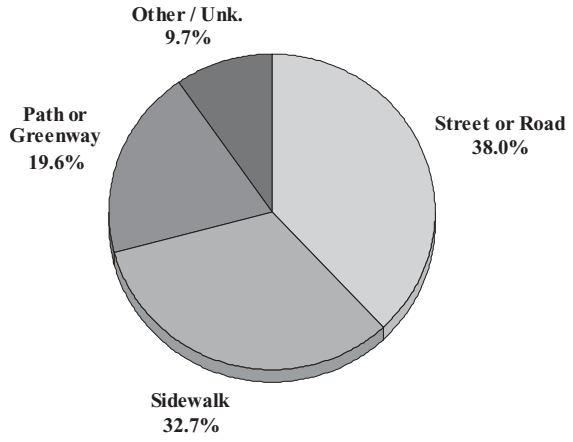
As was the case for bicycling, most adults walk for fun or exercise; one in five, however, walk as part of their daily work commute.

Where Walk

Respondents were asked whether they were most likely to walk on sidewalks, along a street or road, or on an off-road path or greenway (Figure 28). The most frequent response given was along a street or road (38.0%), followed by on a sidewalk (32.7%). For those who said that they most often walked on streets or roads, paths or greenways were the next most frequent choice, while for those who said that they most often walked on sidewalks, streets or roads were identified next most often. These results likely reflect the fact that, while streets and roads are accessible to almost everyone, sidewalks and paths or greenways are not.

There were age differences in where respondents walked. Younger adults ages 18-29 were the most likely to report walking on sidewalks, whereas adults ages 60 and above were the most likely to report walking in streets or roadways. The age group most likely to report walking on paths or greenways were the 50-59 year-olds. Again, these results may reflect the availability of various walking facilities, and where these age groups tend to live, as much as they do preferences. Gender differences were not significant.

Figure 28. Where most likely to walk.



The vast majority of walking takes place along streets or roadways or on sidewalks.

Improving Conditions for Walking

As was done for bicycling, participants were asked to identify any changes or improvements that they thought would make it easier or safer for people to walk in their neighborhood, as well as beyond the immediate neighborhood or area in which they lived. These results are summarized in Tables 7 and 8. Nearly half of the participants indicated that no changes were needed,

either in their immediate neighborhood or beyond their neighborhood. By far the most frequently recommended improvement was the addition of sidewalks, noted by about 28% of the respondents. Within the neighborhood, respondents also expressed interest in reducing the amount of traffic, improving street lighting, and adding trails or greenways. Beyond the neighborhood, the top priorities (in addition to adding sidewalks) were adding off-road trails or greenways, widening streets, and reducing the amount of traffic.

Even though the overall response patterns were similar to the two questions about improvements within and outside the neighborhood, people did not necessarily respond in the same way to both questions. Overall, 44.0% of respondents offered different responses to the two questions.

Table 7. Suggestions for making it easier or safer to walk *within* the neighborhood.

Suggested Improvement	N[1]	%
Nothing needed / can't think of anything	454	47.1
Add sidewalks	278	28.9
Reduce amount of traffic	44	4.6
Widen streets	33	3.4
Add / improve street lighting	29	3.0
Add / improve off-road greenways or trails	27	2.8
Improve / repair sidewalks	15	1.6
Add / improve road shoulders	15	1.6
Control dogs	11	1.1
Trim bushes	10	1.0
Repair pavement	8	0.8
Increase enforcement of traffic laws (e.g., speeding)	8	0.8
Add / improve crosswalks	7	0.7
Pave roads	5	0.5
Other	20	2.1
TOTAL	964	100.0

[1] Missing, unknown, and not applicable responses omitted.

Sidewalks are a top priority for improving conditions for walking.

Table 8. Suggestions for making it easier or safer to walk *outside* the neighborhood.

Suggested Improvement	N[1]	%
Nothing needed / can't think of anything	417	47.8
Add sidewalks	248	28.4
Add / improve off-road greenways or trails	51	5.8
Widen streets	37	4.2
Reduce amount of traffic	22	2.5
Add / improve road shoulders	17	1.9
Add / improve street lighting	16	1.8
Improve / repair sidewalks	9	1.0
Increase enforcement of traffic laws (e.g., speeding)	9	1.0
Trim bushes	8	0.9
Add / improve crosswalks	7	0.8
Educate, improve attitudes	7	0.8
Add / improve crosswalks	5	0.6
Control dogs	5	0.6
Other	15	1.7
TOTAL	873	100.0

[1] Missing, unknown, and not applicable responses omitted.

Opinions on Issues Related to Bicycling and Walking

A final three questions on the survey were designed to gather respondents' opinions on issues related to bicycling and walking. Participants were asked whether they agreed or disagreed with the following statements:

- My community should spend more money to make it easier and safer for people to bicycle or walk.

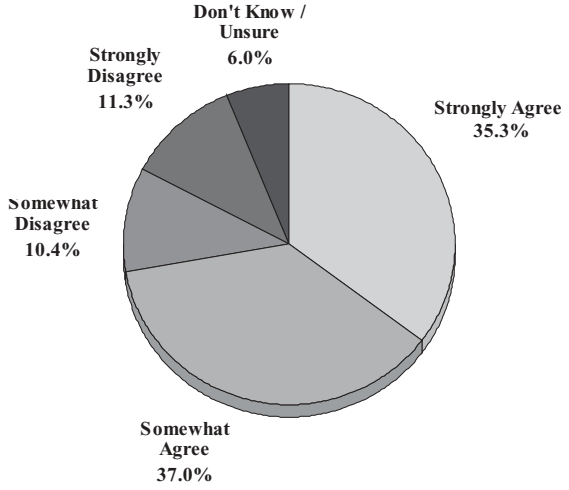
- More state transportation dollars should go to support bicycling and walking.

- There should be a statewide law requiring children to wear helmets when they ride bicycles. *(Note that the survey date preceded passage of a statewide helmet law for children under the age of 16. This legislation was passed in the summer of 2001, and went into effect January 1, 2002.)*

Responses to the three questions are summarized in Figures 29-31. Since opinions on these issues varied by age as well as sex, the column charts show responses within levels of these two variables, while the pie charts show the overall results weighted to reflect the age and sex composition of North Carolina.

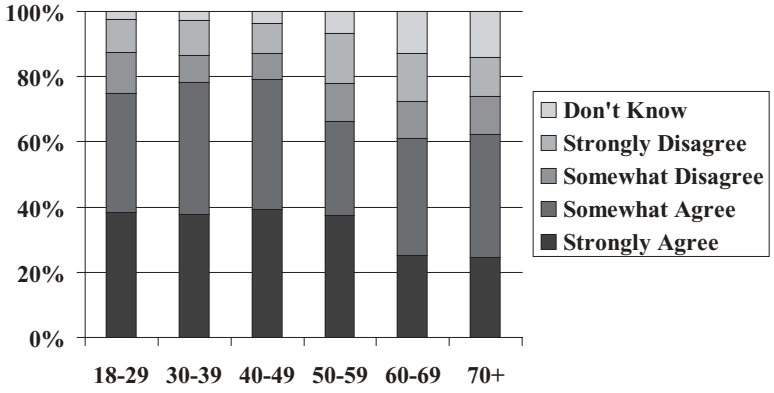
Overall, three out of four North Carolina adults strongly or somewhat agreed that their communities should spend more money to improve conditions for bicycling (Figure 29a). Younger respondents were the most likely to strongly support higher levels of community spending to improve conditions for bicycling and walking (Figure 29b). Older respondents (those age 60 and above) were the least likely to strongly support increased community spending, and were also more likely to respond that they did not know or had no opinion on this issue. Males and females were about equally likely to strongly support increased spending (Figure 29c). And while males were more likely than females to strongly oppose such spending, the percentage strongly opposing was relatively small for both groups (16.1% for males, 7.0% for females).

Figure 29a. Agreement with the statement:
My community should spend more money to make it easier and safer for people to bicycle or walk. (Weighted results)



Nearly three-fourths of North Carolinians want their communities to spend more money to make it easier and safer to bicycle or walk.

Figure 29b. Agreement with the statement:
My community should spend more money to make it easier and safer for people to bicycle or walk, by age of respondent.



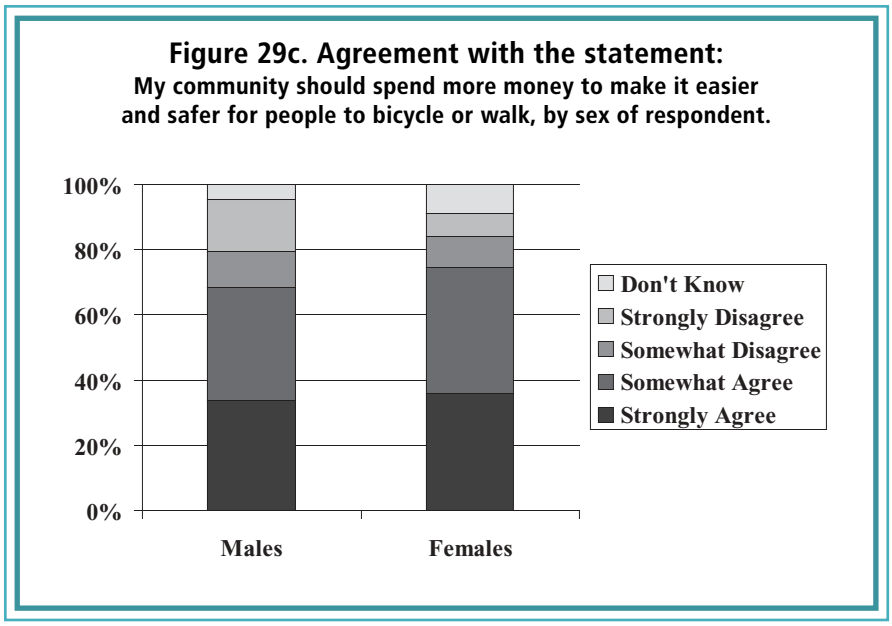
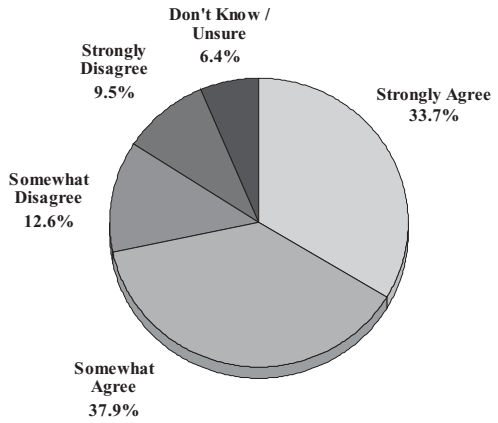


Figure 29c. Agreement with the statement:
My community should spend more money to make it easier and safer for people to bicycle or walk, by sex of respondent.
100%
80%
60%
40%
20%
0%
Males
Females
Don't Know
Strongly Disagree
Somewhat Disagree
Somewhat Agree
Strongly Agree

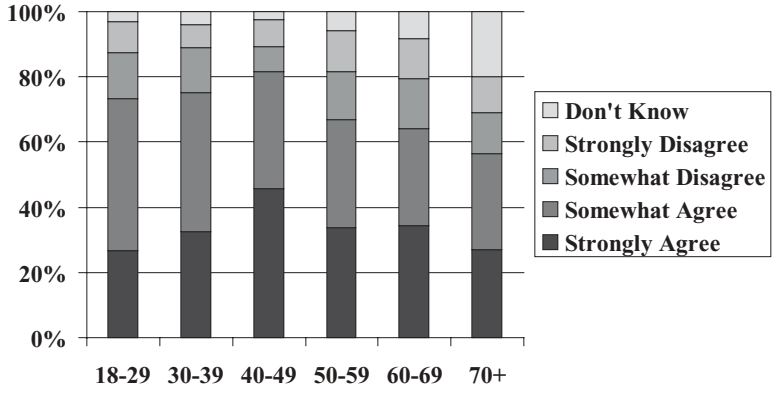
Opinions regarding increased spending of state transportation dollars for bicycling and walking were similar, with greatest levels of support among younger respondents and females (Figure 30a-c). Overall, one-third (33.7%) of North Carolina adults strongly agreed that more state transportation dollars should be allocated to support bicycling and walking, compared to less than 10% who strongly disagreed with this viewpoint. The combined total for "strongly agree" and "somewhat agree" is 71.6% (weighted results), indicated widespread support for state as well as community spending to support bicycling and walking.

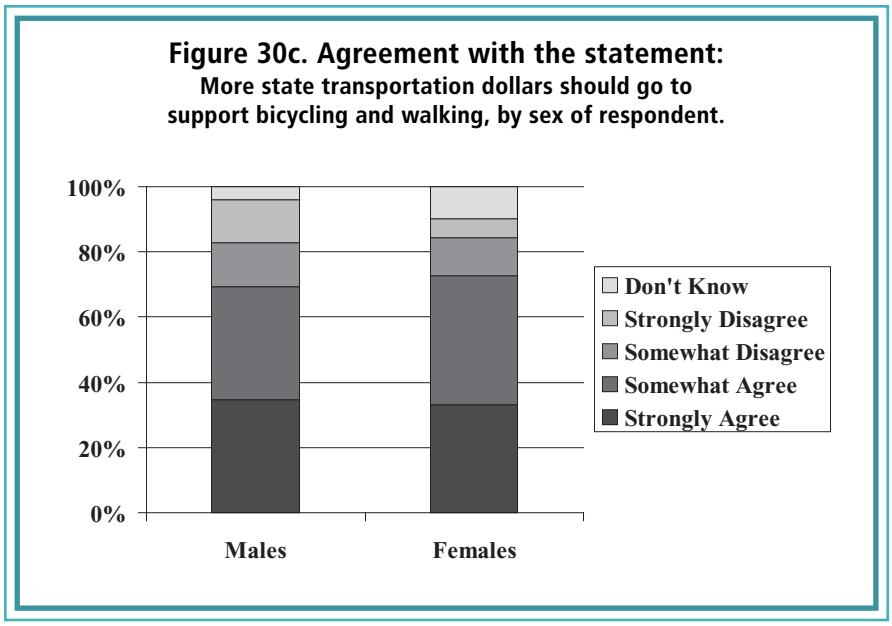
Figure 30a. Agreement with the statement:
More state transportation dollars should go to support bicycling and walking. (Weighted results)



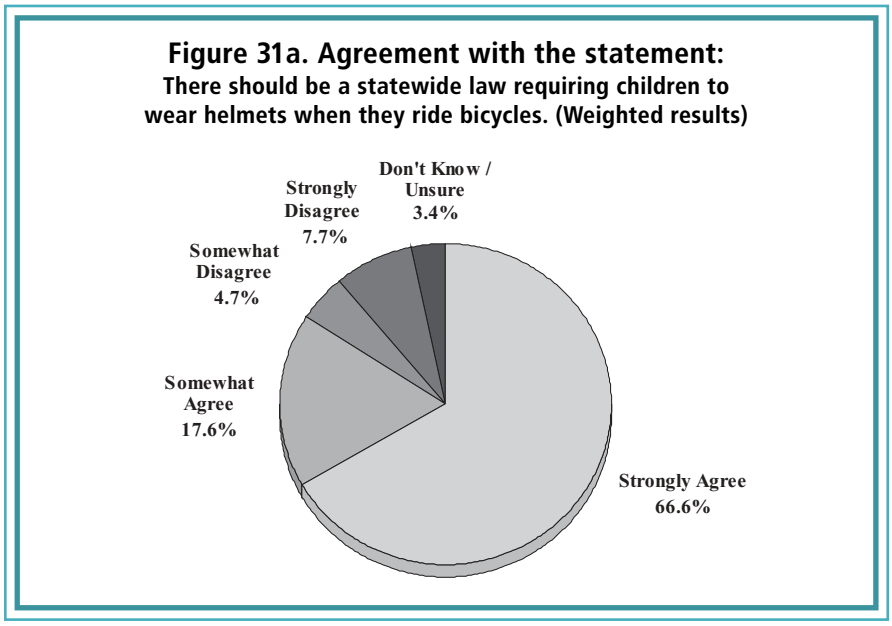
Respondents also felt that more state transportation dollars should go to support bicycling and walking.

Figure 30b. Agreement with the statement:
More state transportation dollars should go to support bicycling and walking, by age of respondent.





By far the highest level of support was for passage of a statewide law requiring children to wear helmets when riding bicycles (Figure 31a-c). This was especially true for adults under age 60 and for females. Overall, an estimated two-thirds (66.7%) of North Carolina adults strongly agreed that children should be required to wear helmets, and an additional 17.6% somewhat agreed. Only 7.7% strongly disagreed that there should be a mandatory helmet law for children.



There was an overwhelming amount of support for a statewide law requiring children to wear helmets when riding their bikes.

Figure 31b. Agreement with the statement:
There should be a statewide law requiring children to wear helmets when they ride bicycles, by age of respondent.

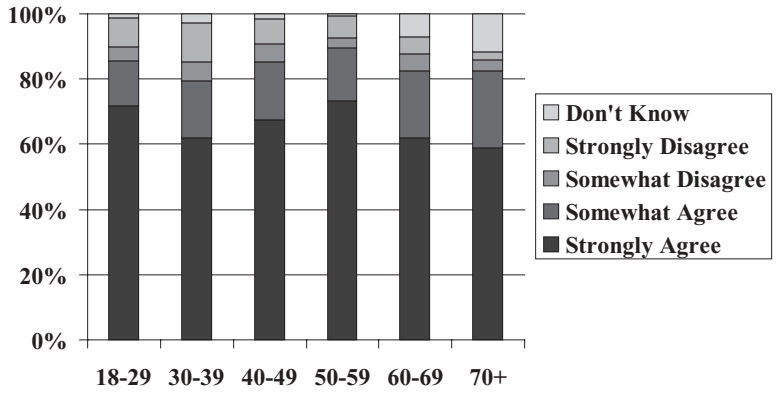
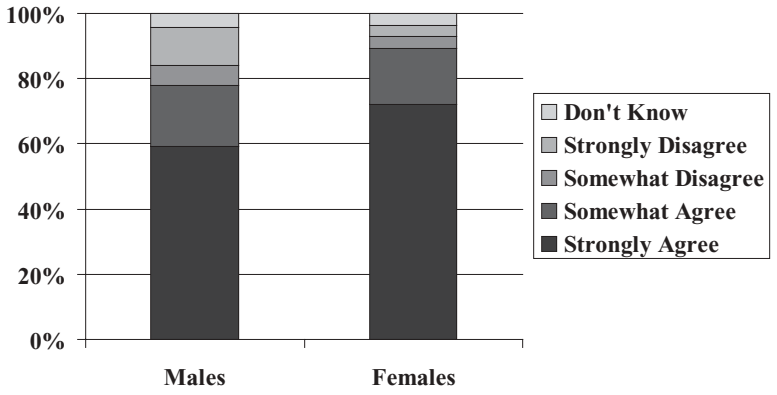


Figure 31c. Agreement with the statement:
There should be a statewide law requiring children to wear helmets when they ride bicycles, by sex of respondent.



Participant Comments and Suggestions

At the end of the survey, participants were asked if they had any comments or suggestions for the NC Department of Transportation about what it could do to encourage more people in the state to bicycle or walk. One-third of the participants (33.1%) volunteered their thoughts, which are summarized in Table 9. Of the 331 respondents to the open-ended question, 67 (20.2%) said that the DOT should concentrate its efforts on making it safer for people to bicycle and walk. Others were more specific and focused on improving facilities for walking and bicycling: 56 (16.9%) said that the DOT should build more sidewalks or improve existing sidewalks; 54 (16.3%) said it should build more paths or greenways, including off-road bicycling paths; and 48 (14.5%) said it should add more bicycle lanes. An additional 27 respondents (8.2%) said that roadways needed to be improved and/or widened, while another 27 (8.2%) simply said that people would bicycle or walk more if there were more or better places to do so. Other responses pertaining to facilities included adding traffic signals and/or street lights.

Table 9. Suggestions offered for encouraging more people to bicycle or walk.

Suggestion	N	% of respondents[1]
Increase safety	67	20.2
Add / improve sidewalks	56	16.9
Build more paths and greenways	54	16.3
Add more bicycle lanes on roadways	48	14.5
Emphasize health benefits	47	14.2
Advertise	44	13.3
Improve / widen roads	27	8.2
Create more / better places to bicycle and walk	27	8.2
Community events / incentive programs	10	3.0
Rider education programs	10	3.0
Add street lighting	7	2.1
Publicize environmental benefits	5	1.5
Increase animal control	4	1.2
Add signs alerting motorists to bicyclists	3	0.9
Reduce vehicle speeds / enforce speed limit	3	0.9
Other	22	6.7

[1] N=331, Percentages total more than 100% due to multiple suggestions by some respondents.

One-third of participants offered additional suggestions for the DOT.

In addition to improved facilities for bicycling and walking, another frequent suggestion was for the DOT to use advertisements (13.3%), and in particular to publicize the health benefits of bicycling and walking (14.2%). A few of the respondents also noted the environmental benefits associated with bicycling and walking. Other suggestions for encouraging walking and bicycling included rider education programs, community sponsored events or incentive programs, increased enforcement to reduce vehicle speeds, and better animal control. These comments came from bicyclists as well as non-bicyclists, and walkers as well as non-walkers.

Summary and Conclusions

One thousand adults participated in the North Carolina Year 2000 Bicycling and Walking survey. The survey was the first statewide survey of bicycling conducted by the Department of Transportation since 1977, and its first ever survey of walking. The results of the survey provide a baseline measure of current levels of bicycling and walking, as well as direction for increasing these levels in the future.

Among other important findings, the survey revealed that:

- Large numbers of North Carolinians ride bicycles and walk on a regular basis, primarily for enjoyment and exercise. One-fourth of the survey participants had ridden a bicycle in the past year, and more than one in ten had bicycled in the past 30 days. **These percentages translate into an estimated 1.3 million adult bicyclists in the state, and 634,000 adult riders each month.**

- 72% of children under the age of 18 were also reported to ride bicycles. This translates to an **additional 1.4 million riders** statewide.

- Seven in ten North Carolina adults without serious health restrictions had walked in the past week, many on a daily or almost daily basis. On average, North Carolinians walk just over 30 minutes a day, but many walk much more as part of their regular daily routines.

- Although long distances were the most important reason respondents gave for not bicycling or walking to work or other targeted destinations, safety was also an important consideration. Survey participants expressed an interest in more facilities such as bicycle lanes, sidewalks, and off-road paths or greenways to make their work commutes safer for bicycling and walking.

- In general, people were pleased with neighborhood conditions for bicycling and walking. When they did have suggestions, it was again for more facilities including bicycle lanes and sidewalks, wider streets, and reduced traffic and vehicle speeds.

- Although two-thirds of adults reported owning bicycle helmets, only half said that they always wore them. Reported ownership was even higher among children, but reported use was again lower, especially among 10-15 year-olds.

- Very few survey respondents reported that their children bicycled or walked to school.

Most rode in private automobiles or on school busses. Distance was a constraining factor, although the safety of the route to school was also noted.

- North Carolina adults strongly supported passage of a statewide helmet law for children. The majority also support increased community and State transportation spending to make it easier and safer for people to bicycle and walk.

- To encourage more people in the State to bicycle and walk, survey respondents cited the need for better facilities: more bicycle lanes, more sidewalks, and more off-road paths and greenways. Respondents also noted that people need to feel safe when they bicycle or walk. In addition, it was suggested that the DOT publicize the health and environmental benefits of walking and bicycling, and that communities and employers actively promote bicycling and walking.

There are few comparable surveys to which the current results can be compared. The 1977 North Carolina Bicycle survey, which served as a basis for the current effort, included some similar questions and categories, but had a different target audience. Whereas the current survey focused on a single adult member of a household age 18 or above, the 1977 survey captured information on all household members, including young children. And while information was collected on age and other respondent demographics, the survey results were not recorded and reported in a manner that allows for direct comparisons between the two sets of results. One point of comparison, however, is that the 1977 survey reported that 54% of the contacted households owned bicycles, while the corresponding percentage for the current survey was 46%. Although part of this difference may be due to the overrepresentation of older adults in the current unweighted sample, it may also reflect a slight decrease in bicycle ownership over the 20+ year interval since the 1977 survey was conducted.

Current survey results pertaining to bicycle helmet ownership and use are of particular interest in light of recent N.C. legislation requiring children under the age of 16 to wear helmets when riding. This legislation, which was passed several months after the survey was conducted, became effective January 1, 2002. During the late spring and summer of 1999, HSRC conducted a statewide observational survey of bicycle helmet use for the NC Governor's Highway Safety Program (Hunter et al., 1999). It is interesting that, although a higher percentage of children versus adults were reported in the current survey to own helmets, *observed* usage of helmets was highest for adult riders. The actual observed percentages by estimated rider age were:

Age	0-5	6-13	14-18	19-30	31-50	51+
Helmet Use	31%	16%	9%	45%	48%	34%

The especially low observed use rates for teen riders, ages 14-18, was one reason why lawmakers were urged to extend the age range covered by the law to 16, rather than 14 and under as other states have done. These results also agree with the current survey results revealing lower reported helmet use rates by teenage riders.

Nationally, surveys by sporting goods manufacturers continue to show bicycling and walking to be valued forms of physical activity. According to the "Sports Participation in 2000" survey conducted by the National Sporting Goods Association, bicycling is the sixth most popular sporting activity in the U.S., with an estimated 43.2 million persons age seven or above participating six times or more a year. Exercise walking is in the number one position, with 81.3 million participants (NSGA, 2000). Based on an overall U.S. population of 281 million (all ages), these numbers translate into a participation rate of 15% for bicycling and 29% for exercise walking. While differences in target population and activity criteria make it difficult to draw direct comparisons between this survey and the North Carolina survey, bicycling and walking clearly stand out as popular activities.

Another potential source of comparison is the bicyclist and pedestrian survey conducted by Macro International, Inc. in 1999 for the National Highway Traffic Safety Administration. The focus of this survey was U.S. adults ages 16 and older. The Gallup Organization plans to conduct an updated version of the survey during 2002. Current plans are to incorporate both survey results into a final report that will be available in the Spring of 2003.

Finally, a 1991 Consumer Product safety Commission survey estimated that 29% of U.S. households contained active bicyclists, i.e., one or more persons who had bicycled within the past year (Rodgers, 1995). In the current North Carolina survey, 23% of the adults surveyed said that they had bicycled within the past year. This percentage is lower, but does not include other adult members of the household and/or any children in the household who bicycle.

In summary, the North Carolina Year 2000 Bicycling and Walking survey clearly indicates that North Carolinians value bicycling and walking and want their State and communities to continue their efforts to create more and safer places to bicycle and walk. In the face of increased automobile use and ever increasing traffic and congestion, it is more critical than ever that specific efforts be taken to ensure that bicycling and walking are viable modes of transportation as well as opportunities for healthy physical activity and enjoyment of the outdoors.

References

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Rodgers, G. B. *Bicycle helmet use patterns in the United States: A description and analysis of national survey data.* Accident Analysis and Prevention, 1995, 27(1), 43-56.

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Appendix A

North Carolina
Bicycling and Walking Survey

ID No. _____

North Carolina Bicycling and Walking 2000 Survey

HOUSEHOLD INFORMATION

1.	First, I just need to confirm that you are age 18 or older. Is that correct? *If under age 18 say, "I'm sorry. We can only interview people age 18 or above. But thank you very much for your time."*	1. ≥18 2. <18 *(terminate)*
2.	And counting yourself, how many persons live in your household?	____ persons in HH

BICYCLING

3a.	The first several questions are about bicycles. Please tell me *(If 1 in HH)* how many bicycles you own? *(If >1 in HH)* how many bicycles are owned by members of your household? These would be bicycles that are in rideable condition, except for maybe a flat tire or some other minor repair. *Note: Clarify if necessary. Only count two-wheeled vehicles or adult tricycles. Don't count children's tricycles or big wheels.*	___ bicycles *If 0, SKIP to #18*
3b.	*(Ask only if >1 in HH; otherwise code according to response above.)* Do you yourself own a bicycle, or have access to one that you can ride?	1. Yes 2. No *(SKIP to #18)* 9. DK/Ref *(SKIP to #18))*
4.	During the past 12 months, have you ridden a bike?	1. Yes 2. No *(SKIP to #18)* 9. DK/Ref *(SKIP)*
5.	And during just the past 30 days, have you ridden a bike?	1. Yes 2. No *(SKIP to #10)* 9. Unsure/DK/Ref

6a.	People ride bikes for lots of reasons. Can you tell me how often **during the past 30 days** you used your bike <u>to travel to or from work</u>? Did you do this: *(Read categories 1-4 the first time, but then only as necessary.)* 1. Every day or almost every day 2. At least once a week 3. Less than once a week 4. Not at all 8. Not applicable (if doesn't work, works at home, etc.) 9. Unsure/DK/Ref	____ *(Enter code)*
6b.	What about riding <u>for fun or exercise</u>. **During the past 30 days**, did you do this: *(read categories 1-4 as needed)*	____ *(Enter code)*
6c.	And how about riding your bicycle <u>to run errands</u>, such as going to the grocery store, the bank, or shopping? How often did you do this **during the past 30 days**? *(read categories as needed)*	____ *(Enter code)*
6d.	And how often did you make any <u>social or recreational trips</u> on your bike **during the past 30 days**, such as a trip to a friend's house, or to a park or sporting event? *(read categories as needed)*	____ *(Enter code)*
6e. 6f.	Is there any <u>other reason</u> you ride your bike that I haven't covered? *(Describe below.)* And how often did you do this **during the past 30 days**? *Leave blank if no other reason given.*	____ *(Enter code)*
7.	Thinking back over just the last 7 days, can you tell me on how many of those days you rode your bike?	____ days

8a. 8b.	*(Ask unless said rides to work every day or almost every day for #6a. If already know doesn't work, code 98 and skip to next question.)* Can you tell me the main reason why you don't ride your bicycle to work (more often)? *(Do not read list. Probe for single most important reason.)* And are there other reasons why you don't ride to work (more often)? *(Do not read categories, but clarify as necessary. Code up to 3)* 1. Too far 2. Takes too long (compared to driving) 3. Not safe / don't feel safe (with respect to cars, not crime) 4. Too much traffic 5. Drivers not considerate of bicyclists, aggressive drivers, road rage 6. No space, not enough room on road, narrow roads 7. No bike lanes 8. No off-road paths 9. Prefer to drive/carpool, driving more convenient, driving easier 10. Prefer to walk 11. Prefer to use public transportation 12. Need to drop off kids, run errands, etc. 13. Need car while at work 14. Have to carry too much (things needed for work, workout gear, etc.) 15. Work requires dress professionally / Won't look nice for work 16. Work hours (work evenings, nighttimes, etc.) 17. Get too hot and sweaty 18. No shower at work 19. No secure place to park/leave bike 20. Too hot / Too cold / Too rainy, etc. (weather-related) 21. Too hilly (topography-related) 22. Unsafe due to crime (crime-related) 23. Physical impairment (health-related) 24. Never thought about it 25. 26. 30. Other (Specify) _____ 98. Not applicable (don't work, work at home, etc.) 99. Unsure/Don't Know/Don't know	*Enter codes below:* Main Reason: ___ Other Reasons: a. ___ b. ___ c. ___ *Use space below to write out reasons as mentioned:*
9.	And for going places other than to work, what would you say is the main reason why you don't ride your bike more often? *(same categories as above)*	Main Reason: ___

	Now I have a few questions about the places where you might ride your bicycle. Can you just tell me, yes or no, whether you ride your bike:	1 2 3
10a.	On sidewalks	Yes No Unk
10b.	On neighborhood streets	Yes No Unk
10c.	On main roadways along with other traffic	Yes No Unk
12d.	On bike paths or greenways	Yes No Unk
10e.	On off-road trails (i.e., mountain biking)	Yes No Unk
10f.	And of those places I just mentioned, where would you say you ride most often? *(Describe any other location mentioned below)*	1. Sidewalks 2. Nborhood streets 3. Main roadways 4. Paths/greenways 5. Off-road trails 6. Other 9. Unsure/DK/Ref
11a	In the past 12 months, have you ridden a bicycle while on a trip or a vacation?	1. Yes 2. No *(Skip to #12)* 9. Unsure/DK/Ref
11b.	Was this in NC, or was it somewhere else?	1. NC 2. Other than NC 3. Both (if >1 trip) 9. Unsure/DK/Ref
11c.	And what was the longest distance you rode in a single day? Would you say *(read categories)*:	1. Less than a mile 2. 1-10 miles 3. 10-20 miles 4. More than 20 mi. 9. Unsure/DK/Ref
12a.	Do you own a bicycle helmet, or have one that you can use?	1. Yes 2. No *(Skip to #13)* 9. Unsure/DK/Ref
12b.	And how often do you wear your helmet when your ride? Would you say always, usually, sometimes, rarely, or never? (Note: “almost always” = “usually”)	1. Always 2. Usually 3. Sometimes 4. Rarely 5. Never 9. Unsure/DK/Ref

BICYCLE CRASHES AND FALLS

13a. 13b.	Can you tell me whether, over the past 12 months, you have been in an accident or fallen while riding a bicycle? How many?	1. Yes 2. No *(SKIP to #18)* 9. Unsure/DK/Ref ____ accidents/falls
14.	(At the time of your most recent accident) Where were you riding at the time? -- on the street, a sidewalk, a public driveway, parking lot, bikepath, off-road trail, or some other location? *(Describe any other location below. Or if unsure, describe and we'll code.)*	1. Roadway / street 2. Sidewalk 3. Driveway (private/public) 4. Parking lot 5. Bikepath/greenwy 6. Off-road trail 7. Other (describe) 9. Unsure/DK/Ref
15.	Were there any other vehicles, or other bicyclists or pedestrians involved? *(Categorize into one of the following. Do not read categories. If uncertain of category, write out description below.)* 1. Bicycle only (fell, hit object in road, ran off road, car forced off road, fell trying to avoid object, dog caused to fall, etc.) 2. Collision with moving motor vehicle 3. Collision with parked or stopped motor vehicle (includes open car door) 4. Collision with pedestrian 5. Collision with another bicyclist 6. Other (describe): _____ 9. Unsure / Don't know / Refused	*Enter code below.* ____
16.	Did you receive any injuries as a result of your fall/accident? *If YES, ask:* Were they serious enough to require treatment by a doctor or other medical professional?	NO: 1. No injuries YES: 2. Non-serious inj 3. Serious injury 9. Unsure/DK/Ref
17.	*If more than one fall or injury in past year:* Did (any of) the other __ accidents or falls you had during the past 12 months result in a serious enough injury that you needed to see a doctor or other medical professional for treatment?	1. Yes 2. No 9. Unsure/DK/Ref

NEIGHBORHOOD CONDITIONS FOR BICYCLING

18.	Thinking about the neighborhood or area where you live, I'd like your opinion about any changes or improvements that would make it easier or safer for people to ride a bicycle. Is there anything you feel would improve your neighborhood or area for bicycling? *(Don't read categories. Probe for multiple responses and code all mentioned.)* 1. Reduce amount of traffic, reduce speeds, etc. (general "traffic calming") 2. Widen streets / give more space in general 3. Add sidewalks, allow bicyclists to use sidewalks 4. Add bike lanes 5. Add off-road greenways or trails 6. Add paved shoulders 7. Repair pavement, fix potholes, remove loose gravel or sand, etc. 8. Trim bushes, tree limbs, etc. (e.g., to improve visibility, appearance, etc.) 9. Clean up trash, objects in road, etc. 10. Prohibit on-street parking / enforce laws against on-street parking 11. Improve/add traffic signals, make responsive to bicyclists, etc. 12. Improve street / intersection design (turn lanes, one-ways, etc.) 13. Keep out large trucks / anything related to trucks 14. Educate motorists/bicyclists, encourage "share the road," improve attitudes 15. Increase police enforcement of speed limits, stop sign violations, etc. 16. Anything to reduce crime (police patrols, bike patrols, etc.) 17. Control dogs 18. Make less hilly / change topography 19. 20. 21. Other 1 (describe): _____ 22. Other 2 (describe): _____ 98. Nothing needed / can't think of anything needed 99. Unsure / DK / Refused	*Enter codes below.* a. ____ b. ____ c. ____ d. ____ e. ____ **WRITE OUT AND CODE LATER**:
19.	And what about *beyond* the area or neighborhood where you live – are there changes or improvements you think would make it easier or safer for people to bicycle beyond your neighborhood? *(Use same codes as above.)*	*Enter codes below.* a. ___ b. ___ c. ___ d. ___ e. ___

CHILDREN IN HOUSEHOLD *(Ask if >1 in household. See front page.)*

20.	We are also interested in children's use of bicycle helmets, and about their travel to and from school. Can you tell me if there are any children under the age of 18 living in the household?	1. Yes 2. No *(Skip to #25)* 9. Unsure/DK/Ref
21.	And what is the age and sex of each child, starting with the oldest?	Age Sex Child 1 ___ ___ Child 2 ___ ___ Child 3 ___ ___ Child 4 ___ ___ Child 5 ___ ___

CHILDREN'S HELMET USE
(Record responses in same order as identified above)

22a.	Does the __-year-old <u>ride a bicycle</u>? 1. Yes 2. No *(Code 8's for 22b and 22c, and SKIP to next child, or to #23 if no more children)* 9. Unsure/DK/Ref *(SKIP to next child, or to #23 if no more children)*	22a 22b 22c Child 1 __ __ __ Child 2 __ __ __
22b.	Does he/she <u>have a helmet</u> he/she can wear when riding? 1. Yes 2. No *(Code 8 for 22c, and SKIP to next child, or to #23 if no more children)* 8. Not applicable (does not ride) 9. Unsure/DK/Ref *(SKIP to next child, or to #23 if no more children)*	Child 3 __ __ __ Child 4 __ __ __ Child 5 __ __ __
22c.	And <u>how often</u> would you say he/she wears his/her helmet? Would you say always, usually, sometimes, rarely, or never ? 1. Always 2. Usually (or "almost always") 3. Sometimes 4. Rarely 5. Never 8. Not applicable (does not ride / does not own a helmet) 9. Unsure/DK/Ref	

CHILDREN'S SCHOOL TRAVEL
(Again, use same ordering of children established in Question #21)

	Now I have a few questions about your child/children's travel to school.	
24a.	Did/does the ___-year-old attend (elementary / middle / high school) school (this past year)? 1. No, did/does not attend school *(Code 8's for 24b and 24c, and SKIP to next child, or to #25 if no more children)* 2. Yes, Elementary (grades K-5 0r K-6) 3. Yes, Middle school (grades 6-8 or 7-9) 4. Yes, High school (grades 9-12 or 10-12) 9. Unsure/DK/Ref *(SKIP to next child, or to #25 if no more children)*	24a 24b 24c Child 1 __ __ __ Child 2 __ __ __ Child 3 __ __ __ Child 4 __ __ __ Child 5 __ __ __
24b.	And how does this child usually travel to school -- is it in a car, a school bus, walking, bicycling, or some other mode of transportation? 1. Car / carpool 2. School bus or van 3. Walk (or skate) *(Skip to next child, or to #25 if no more children)* 4. Bike *(Skip to next child, or to #25 if no more children)* 5. Other *(describe)*: _____ 8. Not Applicable (doesn't attend school, home school, boarding school) 9. Unsure/DK/Refused	
24c.	*(Ask only if child does not walk or bike)* Can you tell me the main reason why your child doesn't walk or bicycle to school? 1. School too far away 2. Easier or more convenient to drive / drop off on way to work / etc. 3. Too dangerous, too much traffic on road, busy intersections, fast cars, etc. 4. No sidewalks, bike paths for walking or riding 5. No crossing guards at intersections / crosswalks / crossing guards / lights 6. Crime / fear of crime 7. Child doesn't want to 8. Parent doesn't want child to (but none of the specific reasons above given) 9. Too much to carry (books, sporting equipment, etc.) 10. After school activities 11. 12. 13. 17. Other (specify): _____ 18. Other (specify): _____ 19. No particular reason / never thought of it 98. Not Applicable (doesn't attend school, home school, boarding school) 99. Unsure/DK/Refused	

WALKING

25.	Now I have just a few questions to ask about any walking you may do. But first, do you have any physical limitations that restrict the amount of walking you're able to do? *If NO, code 1. If YES, probe:* Would you say this somewhat, or severely, restricts your ability to walk?	1. No limitations 2. Somewhat restrict 3. Severely restrict *(Skip to #30)* 9. Unsure/DK/Ref
26a. 26b. 26c.	When answering these next questions, please consider any walking you do **outside**, whether on streets, sidewalks, or on paths. Using this definition, during the past 7 days, on how many days did you walk distances of 2 blocks or more? *Do not count jogging or walking on tracks or in shopping malls, but **check** here if they said they did either of these.*	____ days ____ *Ran or jogged* ____*Walked indoors or on tracks*
27a.	Thinking back **over the past 30 days**, please tell me how often you walked outside as part of a trip to work? For example, if you walked 2 or more blocks to catch a bus or to get from a parking lot to your office. Did you do this: *(Read categories 1-4 the first time, but then only as necessary.)* 1. Every day or almost every day 2. At least once a week 3. Less than once a week 4. Not at all 8. Not applicable (if doesn't work, works at home, etc.) 9. Unsure/DK/Ref	____ *(Code #)*
27b.	*(If code not at all or N/A above, skip asking this question but code N/A.)* **During the past 30 days**, how often did you walk as your primary means of getting to work? Did you do it: *(read categories)*	____ *(Code #)*
27c.	How often **over the past 30 days** did you walk 2 or more blocks **outdoors** purely for enjoyment or exercise? Again, did you do this: *(read categories)*	____ *(Code #)*
27d.	How often **over the past 30 days** did you walk 2 or more blocks to do errands, such as going to the grocery store, the bank, or shopping? *(Read categories as necessary)*	____ *(Code #)*
27e.	How often **over the past 30 days** did you walk 2 or more blocks as part of a social or recreational trip, such as going to park, a restaurant, or to visit with friends?	____ *(Code #)*

27f. 27g	Is there any other reason you walk that I haven't covered? *Describe in space below and code frequency in box. Leave blank if no other reason given. Note: Walking the dog might be coded here, if not already included in 27c. Also, walking to church.*	____ *(Code #)*
28a. 28b.	Now I have a couple questions about <u>where you walk</u>. Are you most likely to walk on sidewalks, along a road, or on an off-road path? And where do you walk next most often -- on (name the two remaining options)?	MOST OFTEN 1. Sidewalk 2. Street or road 3. Path or greenway 9. Unsure/DK/Ref NEXT MOST 1. Sidewalk 2. Street or road 3. Path or greenway 9. Unsure/DK/Ref
29a. 29b. 29c.	Thinking now just about yesterday, about how much time altogether did you spend walking? Again, I'm primarily interested in any walking you did outside that was on streets, sidewalks, or paths. *Check here if also said jogged.* *Check here if also said walked indoors or on tracks or if hiked in woods.*	*(Code actual time, in minutes)* _____ ___ jogged ___ other walking

NEIGHBORHOOD CONDITIONS FOR WALKING

30.	Thinking about the neighborhood or area where you live, are there changes or improvements that would make it easier or safer for people to walk? (*Prompt:* Is there anything you feel would improve your neighborhood for walking?*)* *(Don't read categories. Probe for multiple responses and code all mentioned.)* 1. Reduce amount of traffic, reduce speeds, etc. (general "traffic calming") 2. Widen streets / give more space in general 3. *Add sidewalks* 4. Improve/repair sidewalks / separate further from road 5. Add/improve off-road greenways or trails 6. Add/improve shoulders 7. Repair pavement, remove loose gravel or sand, pave road, etc. 8. Trim bushes, tree limbs, etc. (to improve visibility, appearance, etc.) 9. Make more attractive for walking, clean up trash, etc. 10. Prohibit on-street parking / enforce laws against on-street parking 11. Add/improve traffic signals 12. Add/improve crosswalks 13. Add/improve street lighting 14. Educate motorists, improve attitudes 15. Increase police enforcement of speed limits, stop sign violations, etc. 16. Anything to reduce crime (police patrols, bike patrols, etc.) / concern for safety 17. Control dogs 18. Make less hilly / change topography 19. 20. 21. Other 1 (describe): _____ 22. Other 2 (describe): _____ 98. Nothing / can't think of anything 99. Unsure / DK / Refused	*Enter codes below.* a. ____ b. ____ c. ____ d. ____ e. ____ **WRITE OUT AND CODE LATER:**
31.	And what about beyond the immediate area or neighborhood where you live -- are there changes or improvements you think are needed to make it easier or safer for people to walk? *(Use same codes as above.)*	*Enter codes below.* a. ____ b. ____ c. ____ d. ____ e. ____

OPINIONS

	I have a few questions I'd like your opinion on, then we're almost through. Please tell me whether you agree or disagree with the following statement:	
32.	My community should spend more money to make it easier and safer for people to bicycle or walk. *Prompt:* And is that strongly (agree/disagree) or just somewhat (agree/disagree)?	1. Strongly agree 2. Somewhat agree 3. Somewhat disagr 4. Strongly disagree 5. DK / No opinion 9. Refused
33.	More state transportation dollars should go to support bicycling and walking. *Prompt:* And is that strongly (agree/disagree) or just somewhat (agree/disagree)?	1. Strongly agree 2. Somewhat agree 3. Somewhat disagr 4. Strongly disagree 5. DK / No opinion 9. Refused
34.	(And last of these questions) Do you agree or disagree that there should be a statewide law requiring children to wear helmets when they ride bicycles? Is that strongly or just somewhat (agree, disagree)?	1. Strongly agree 2. Somewhat agree 3. Somewhat disagr 4. Strongly disagree 5. DK / No opinion 9. Refused

DEMOGRAPHICS

	There's just a few final questions that will help us summarize the results of the study.	
35.	In which county do you live? *(Write out name of county - we'll code later)*	_____
36.	Would you say you live in the country, in a small town population less than 25,000, in a small or medium-sized city up to 75,000 in population, or in a larger city? Note: Rural area = "in the country" Small town = <25,000 pop. Medium sized city = 25-75,000 pop. Larger city = >75,000 pop. (includes suburbs)	1. Rural area 2. Small city/town 3. Medium city/twn 4. Larger city 9. Unsure/DK/Ref.
37.	And what is your current age? *(Code 99 if refuses)*	_____ years

38.	And your race? *(Use categories only to clarify)*	1. White 2. Black /Afric Am 3. Hispanic 4. Asian / Pacific I. 5. American Indian 6. Combination 8. Other (specify) 9. Unsure/Refused
39.	Your highest level of education? *(Use categories only to clarify)*	1. < HS grad 2. High school grad 3. Post high school 4. College grad 5. Post college 6. Graduate degree 9. Unsure/Refused
40.	Please stop me when I get to the category that best describes your household's total annual income from all sources: Is it *(read categories)*:	1. Less than $15,000 2. $15-30,000 3. $30-50,000 4. $50-75,000 5. $75-100,000 6. More than $100K 9. Unsure/DK/Ref.
41.	(DON'T ASK UNLESS NEED TO) Gender	1. Male 2. Female 9. Unsure/DK

CLOSING

42.	Any comments or suggestions for the Department of Transportation about what it should do to **encourage more people** in the state to walk or bicycle? *(Record response below. We will code as useful or not later on.)*	1. No comment 2. Comment

Thank the person for participating.

43. ___ *Do not ask.* Check here only if requests a copy of the survey results.

Appendix B

Introductory Letter
Mailed to Potential Participants

Date

Mrs. John Smith
100 Chapel Hill Street
Chapel Hill, NC 27514

Dear Mrs. Smith:

The University of North Carolina Highway Safety Research Center is working with the state's Division of Bicycle and Pedestrian Transportation to learn more about bicycling and walking in North Carolina. Your name was randomly selected from a list of all licensed drivers in the state. We would like to contact you for a brief telephone survey. The survey will ask about how often you bicycle or walk, the locations where you bicycle or walk most frequently, and your opinions about various facilities for bicycling and walking. Even if you do not bicycle or walk regularly, we are interested in talking with you. The survey should take 10 minutes or less or your time.

Someone from the UNC Highway Safety Research Center will be calling you in the next several days. The person calling will be either Ms. Jane Doe or Mr. John Smith. Your participation in the survey is voluntary; however, we sincerely hope that you do choose to participate. Information from this survey will be used by the Division of Bicycle and Pedestrian Transportation to make bicycling and walking safer and more enjoyable for all.

If you have questions or concerns about the study, please feel free to call me at 1-800-672-4527 Monday-Friday, 8:30-5:30. We look forward to talking with you.

Sincerely,

Jane Stutts, Ph.D.
Project Director