Walking and Cycling in the United States, 2001–2009: Evidence From the National Household Travel Surveys

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Objectives. To assess changes in walking and cycling in the United States between 2001 and 2009.

Methods. The 2001 and 2009 National Household Travel Surveys were used to compute the frequency, duration, and distance of walking and cycling per capita. The population-weighted person and trip files were merged to calculate the prevalence of any walking and cycling and of walking and cycling at least 30 minutes per day.

Results. The average American made 17 more walk trips in 2009 than in 2001, covering 9 more miles per year, compared with only 2 more bike trips, and 5 more miles cycling. At the population level, the prevalence of ''any walking'' remained unchanged (about 18%), whereas walking at least 30 minutes per day increased from 7.2% to 8.0%. The prevalence of ''any cycling'' and cycling 30 minutes per day remained unchanged (1.7% and 0.9%, respectively). Active travel declined for women, children, and seniors, but increased among men, the middle aged, employed, well-educated, and persons without a car.

Conclusions. Walking increased slightly, whereas cycling levels stagnated, and the overall prevalence of active travel remained low. Improved infrastructure for walking and cycling must be combined with programs to encourage active travel among more groups, especially children, seniors, and women. (*Am J Public Health.* 2011;101:S310–S317. doi:10.2105/AJPH.2010.300067)

Walking and cycling are healthy and sustainable means of transport. These forms of active travel contribute to daily physical activity, aerobic fitness, and cardiovascular health while helping to protect against obesity, diabetes, and various other diseases.[1–9] The mounting evidence on the health benefits of walking and cycling has led to public health advocacy for more walking and cycling to improve individual health and to reduce air pollution, carbon emissions, congestion, noise, traffic dangers, and other harmful impacts of car use.[10–15] Thus, it is important to monitor rates of walking and cycling over time and to assess differences among population subgroups.

Rates of active travel to work declined sharply in the United States over the past few decades. The US Census Bureau reported a declining proportion of workers walking to work (as their main mode of transport) from 10.3% in 1960 to 2.9% in 2009.[16,17] Bicycling to work has only been reported since 1980, but it increased from 0.4% in 1980 to 0.6% in 2009. The share of workers taking public transport fell from 12.6% in 1960 to 4.7% in 2000, but then rose to 5.0% by 2009. Most public transport trips involve walking to get to and from public transport stops, but the Census only reports the main mode. Thus, the sharp decline in public transport mode share since 1960 also suggests a decline in walk trips combined with public transport until 2000 and then a slight increase between 2000 and 2009 (see Supplemental Table A, available as a supplement to the online version of this article at http://www.ajph.org).

Unlike the Census, the Nationwide Personal Transportation Survey (NPTS) and the National Household Travel Survey (NHTS) report on travel for all trip purposes, thus providing a more comprehensive view of travel behavior. The NPTS documented a decline in the walk share of trips from 9.3% in 1977 to 5.4% in 1995, but a slight increase in the share of bike trips, from 0.7% in 1977 to 0.9% in 1995.[16,18] The NHTS—successor to the NPTS—reported a higher walk share of trips in 2001 (8.6%) and a constant bike share (0.9%). However, changes in survey design limit the comparability of the 1995 NPTS and the 2001 NHTS.[16,19] Thus, it is unclear whether the walk share of trips increased between 1995 and 2001, or if it is a statistical artifact resulting from the improved methods for capturing previously unreported walk trips.

After 3 decades of declining rates of active travel in the United States, the question is whether there has been a turnaround, and if rates of walking and cycling are now rising. The recently released 2009 NHTS provides a unique opportunity to answer that question, because it employed the same methodology as the 2001 NHTS. Moreover, the NHTS provides household travel information both for the previous day and the previous week. Finally, the NHTS specifically identifies walk and bike trips taken to and from public transport, which were an important component of active travel.[20,21] This article uses the 2 most recent NHTS surveys to measure changes in active travel in the United States from 2001 to 2009. The NHTS data on walking and cycling are analyzed from both the trip-based perspective of travel behavior and the public health perspective of population physical activity rates, adapting the methodology recently developed to analyze transport surveys in Australia.[22]

METHODS

The 2001 and 2009 NHTS were both telephone surveys that used random digit dialing of landline numbers, with a stratified sampling of all states, Census regions, and metropolitan areas so that the survey was representative of the country as a whole. Telephone interviews were supplemented with travel diaries in which households recorded their travel activities for the specific day assigned to them at random. Proxy interviews with adults were conducted for people aged 15

years and younger. The 2001 NHTS was conducted from March 2000 to May 2001, whereas the 2009 NHTS was conducted from March 2008 to April 2009. Sampling was undertaken on all days during those months, including weekends and holidays.

The NHTS includes the civilian, noninstitutionalized population of the United States. It explicitly excludes group living quarters with 10 or more unrelated occupants but includes college students in university housing provided they have landline telephones, each of which is shared by no more than 10 students. Children younger than 5 years from the 2001 data set were excluded from our analysis to ensure comparability between the 2 surveys.

The American Association for Public Opinion Research (AAPOR) response rate for the 2001 NHTS was 41% and included 160 758 persons living in 69 817 households making 642 292 daily trips. The response rate for the 2009 NHTS was 20% and included 324 184 persons living in 150 147 households making 1 167 321 daily trips.[18] NHTS statisticians attributed the falling response rate to the rising percentage of American households using cell phones as their primary phones and use of caller ID to screen solicitation calls.

Both the 2001 and 2009 NHTS surveys incorporated changes in methods and trip definitions compared with their predecessors, which had been criticized for underreporting nonmotorized trips.[16,18,23,24] To facilitate improved reporting of walking and cycling trips, the survey procedure and questionnaire were revised in the 2001 NHTS to provide multiple prompts. In addition, walk and bike trips to access public transport were included for the first time as a separate variable.

Trips were defined as "from one address to another," thus excluding walk trips to the mailbox or parked car, for example, as well as walk trips within shopping malls, but including short trips in the local neighborhood. The exceptions to that trip definition were walk and bike trips that originated and ended at home, without any other stop along the way, such as some recreational or exercise trips (e.g., "going for a walk"). In both 2001 and 2009, such trips were split into 2 trips, one defined as the "outgoing trip" to the farthest distance from home, and the other trip defined as the "inbound trip" back home.

The NHTS included a 1 day self-completed travel diary that asked about trip frequency, length, duration, purpose, and mode of transport. For our active travel analysis, only trips by foot and bike were selected. Walk and bike trips to and from public transport were also included, but it was necessary to extract those from the public transport data file of the survey, which specifically asked about such access and egress trips. Information about individuals was derived from the person file (gender, age, education, employment, car ownership, income, race/ethnicity, and urban vs rural location).

For the trip-based analysis, the daily frequency, duration, and distance of walking and cycling per capita were calculated by dividing the daily totals by the number of persons, yielding average trip rates. We multiplied the daily rates by 365 to obtain approximations of annual rates per capita.

For the person-based analysis, trip characteristics (number, duration, and distance) were aggregated and matched to the trip maker and then added to the person data set. The person data set included individuals who did not make any trips during the travel day (i.e., stayed at home), and thus were not included in the trip file. To include them in the walking and cycling prevalence estimates, we assigned them to the "no walk trip" and "no bike trip" categories.

For the daily physical activity analysis, we used 3 different measures: (1) any walking or cycling, (2) 30 minutes or more of walking and cycling, and (3) 30 minutes or more of walking and cycling accumulated in bouts of at least 10 minutes each. Each of these 3 thresholds of physical activity has important implications for health benefits.[12,25] In addition to the 24-hour trip diary in the trip file, we analyzed the weekly data available in the person file with responses to a separate question about the number of trips made by walking and cycling during the previous week. For the weekly rates, children younger than 15 years were excluded because the 2001 NHTS (unlike the 2009 NHTS) only asked this question for persons 15 years and older. The prevalence of "weekly active travel" was generated from this question, and the percentages of each population subgroup making 0, 1–4, and 5 or more walk and bike trips per week were calculated. The NHTS did not provide time and distance information for the travel week part of the survey. For both the daily and weekly prevalence analysis, we stratified by socioeconomic groups.

Both the 2001 and 2009 NHTS relied on a complex weighting procedure that yielded representative national estimates of travel behavior. The initial weight for each case was the reciprocal of known probability of selection. However, weights were then adjusted for nonresponse based on region, state, city size, race/ethnicity, income, household size, vehicle ownership, and week and month of the year through a so-called "raking" procedure at both the household and person levels. The poststratification weighting procedure adjusted for the exclusion of households without any telephones or with only cell phones by aligning the overall NHTS sample with population estimates of the US Census Bureau. We used the revised, second release of the 2009 NHTS data set, issued in November 2010, which further refined the sample weights to ensure the data set's conformity with newly available 2008 American Community Survey (ACS) Census data. We applied the 2001 and revised 2009 NHTS weights to ensure statistically representative estimates for the United States population as a whole.

Statistical significance was determined by calculating differences in weighted proportions or means between 2 independent samples ($P<.05$). To control for the effects of covariates and possible confounders, logistic regression was used to calculate the likelihood of walking in 2009 compared with 2001, after adjusting for the impacts of other variables.

RESULTS

The 2001 and 2009 NHTS surveys reveal a substantial increase in the share of trips by walking (from 8.6% to 10.5%) but only a slight increase in the share of trips by cycling (from 0.9% to 1.0%). Similarly, increases in the number, duration, and length of walk trips per capita were much greater, and more statistically significant, than for cycling (Table 1). The average American made 17 more walk trips in 2009 than in 2001, spending about 5 additional hours walking and covering 9 more miles; this compares with 2 additional bike trips per year per capita, no additional time cycling, and 5 more miles cycled. Thus,

TABLE 1—Daily and Annual Walking and Cycling Trips, Duration, and Distance per Capita in the United States: National Household Travel Survey, 2001 and 2009

Characteristic	2001, Mean (95% CI)	2009, Mean (95% CI)	Difference 2001–2009
Number of trips			
Trips per capita per day			
Walking	0.462 (0.450, 0.474)	0.509 (0.493, 0.525)	+0.047*
Cycling	0.034 (0.031, 0.036)	0.039 (0.035, 0.044)	+0.005*
Active travel	0.496 (0.484, 0.508)	0.549 (0.532, 0.565)	+0.053*
Trips per capita per year			
Walking	168.6 (164.3, 173.0)	185.8 (179.9, 191.6)	+17.2*
Cycling	12.4 (11.3, 13.1)	14.2 (12.8, 16.1)	+1.8*
Active travel	181.0 (176.7, 185.4)	200.4 (194.2, 206.2)	+19.3*
Duration			
Minutes per capita per day			
Walking	5.420 (5.246, 5.930)	6.205 (5.934, 6.476)	+0.785*
Cycling	0.747 (0.669, 0.824)	0.749 (0.666, 0.833)	+0.002
Active travel	6.166 (5.975, 6.357)	6.955 (6.670, 7.239)	+0.789*
Hours per capita per year			
Walking	33.0 (31.9, 36.1)	37.7 (36.1, 39.4)	+4.8*
Cycling	4.5 (4.1, 5.0)	4.6 (4.1, 5.1)	0.0
Active travel	37.5 (36.3, 38.8)	42.3 (40.6, 44.0)	+4.8*
Distance			
Miles per capita per day			
Walking	0.283 (0.274, 0.293)	0.308 (0.295, 0.323)	+0.025*
Cycling	0.053 (0.047, 0.061)	0.066 (0.061, 0.075)	+0.013*
Active travel	0.336 (0.321, 0.354)	0.374 (0.356, 0.398)	+0.038*
Miles per capita per year			
Walking	103.3 (100.0, 106.9)	112.4 (107.7, 117.8)	+9.1*
Cycling	19.4 (17.2, 22.3)	24.1 (22.3, 27.4)	+4.8*
Active travel	122.6 (117.2, 129.2)	136.5 (129.9, 145.3)	+13.9*

Note. Respondents aged 5 years and older.
*$P < .05$.

increases in active travel came almost entirely from increased walking.

In 2009, about three fourths of walk trips and half of bike trips were for utilitarian purposes such as getting to work, school, shopping, visiting friends, and accessing public transport (see Supplemental Table B, available as a supplement to the online version of the article at http://www.ajph.org). Trips for recreation, exercise, and sports accounted for 27% of walk trips and 49% of bike trips. The most striking change in trip purpose between 2001 and 2009 was an increase in utilitarian cycling from 43% to 51% of bike trips. The single most important purpose of walking was to reach public transport, accounting for 28% of all walk trips in 2001 and 27% in 2009. Over 90% of all public transport trips in 2009 were combined with walking at both ends of the trip for access and egress (see Supplemental Table C, available as as a supplement to the online version of the article at http://www.ajph.org). Cycling to public transport was far less common than walking, comprising 3% of all bike trips in 2009.

Table 2 displays daily prevalence of walking and cycling from a population health perspective, using 3 different measures: (1) any walking or cycling; (2) at least 30 minutes of walking and cycling per day; and (3) at least 30 minutes of walking and cycling per day in bouts of at least 10 minutes each. The prevalence of any walking did not change (18.2% in 2009 vs 18.1% in 2001). There was a slight increase, from 7.2% to 8.0%, in the proportion of Americans achieving the recommended 30 minutes of physical activity from walking. Similarly, the proportion achieving those 30 minutes in walking bouts of at least 10 minutes rose from 6.5% to 7.2%. By comparison, there was no increase in the proportion of Americans cycling by any of the 3 different measures. Less than 2% of Americans cycle daily, and less than 1% of Americans achieve 30 minutes of physical activity through cycling on any given day. Consistent with the trip-based information in Table 1, Table 2 confirms that virtually all of the increased prevalence of active travel was due to increased walking—primarily through increased time walking per walker instead of an increase in the proportion of the population walking at all.

Table 3 displays the prevalence of walking and cycling at least 30 minutes per day for various population subgroups. Increases in walking prevalence between 2001 and 2009 were significant for men; for age groups 25–64 years; for the employed; for the more educated; for the lowest and third income quartiles; and for urban areas. The largest increase (+5.2%) was among people without cars, whose walking prevalence (25.8%) was over 3 times as high as for the population as a whole (8.0%). Statistically significant increases in cycling prevalence were limited to the well-educated, employed, and 45–64 year olds. In contrast, cycling declined significantly among children between the ages of 5 and 15 and among women. Walking declined significantly among persons 65 and older.

Corresponding versions of Table 3 were also calculated for walking and cycling at least 30 minutes per day in at least 10 minute bouts, and for any walking and any cycling on the surveyed travel day (see Supplemental Tables D and E, available as supplements to the online version of the article at http://www.ajph.org). Adding the stipulation of 10 minute bouts generally reduced the prevalence for all population subgroups, but it did not change the overall pattern of differences. The prevalence of any walking was highest among children and lowest among seniors. Between 2001 and 2009, walking significantly declined for both of these groups (–4.2% and –2.3%, respectively).

TABLE 2—Prevalence of Walking, Cycling, and Reaching Recommended Daily Minimum Physical Activity Levels Through Active Transport in the United States: National Household Travel Survey, 2001 and 2009

Activity	2001, % (95% CI)	2009, % (95% CI)	Change 2001–2009
Any walking	18.1 (17.7, 18.5)	18.2 (17.6, 18.6)	+0.1
Minimum of 30 min of physical activity from walking	7.2 (6.9, 7.4)	8.0 (7.7, 8.3)	+0.8*
Minimum of 30 min of physical activity from walking consisting of walk trips of 10 min duration or more	6.5 (6.3, 6.7)	7.2 (6.9, 7.5)	+0.7*
Any cycling	1.8 (1.7, 1.9)	1.7 (1.5, 1.8)	-0.1
Minimum of 30 min of physical activity from biking	0.9 (0.8, 0.9)	0.9 (0.8, 1.0)	0.0
Minimum of 30 min of physical activity from biking consisting of bike trips of 10 min duration or more	0.9 (0.8, 1.0)	0.9 (0.8, 1.0)	0.0
Any walking or biking	19.4 (19.0, 19.8)	19.4 (18.8, 19.7)	0.0
Minimum of 30 min of physical activity from walking or biking	8.0 (7.8, 8.3)	8.8 (8.5, 9.2)	+0.8*
Minimum of 30 min of physical activity from walking or biking consisting of trips of 10 min duration or more	7.3 (7.1, 7.6)	8.0 (7.7, 8.3)	+0.7*

Note. CI = confidence interval. Respondents aged 5 years and older.
*$P < .05$.

In contrast, any walking increased significantly among persons aged 25–44 years (+2.5%) and 45–64 years (+1.8%). The prevalence of any cycling declined significantly for children (–1.5%) and women (–0.3%). Falling cycling levels among women contributed to a growing gender gap, with cycling prevalence almost 3 times higher for men than women in 2009 (2.5% vs 0.9%).

Controlling for gender, age, education, ethnicity/race, car ownership, urban/rural residence, and day of the week, logistic regressions showed that Americans in 2009 (compared with 2001) were slightly but significantly more likely to report walking 30 minutes per day (adjusted odds ratio [AOR]=1.07, 95% confidence interval [CI]=1.05, 1.10), or walking 30 minutes in bouts of at least 10 minutes (AOR=1.07, 95% CI=1.04, 1.09). However, there was a statistically significant but small decrease in the likelihood of any walking (AOR=0.97, 95% CI=0.95, 0.98). Excluding children, the prevalence of any walking increased slightly (AOR=1.02, 95% CI=1.00, 1.04).

Figure 1 summarizes changes in the prevalence of weekly walking for various population subgroups as derived from the single question on the frequency of walking in the previous week, and not including participants younger than 16 years (Supplemental Table F in online version). Overall, any walking during a week increased from 2001 to 2009 for most subgroups, with a declining prevalence in no walking and an increased prevalence of making 5 or more walk trips per week. The elderly were an important exception, reporting an increasing prevalence of no walking per week (41% to 45%), and a decline in 5 or more walk trips per week (from 31% to 30%). For the most part, however, the increased prevalence of weekly walking shown in Figure 1 confirms the increased prevalence of daily walking documented in Table 3. The corresponding prevalence of weekly cycling was also calculated (not shown), which confirmed the lack of growth in prevalence of daily cycling shown in Table 3.

DISCUSSION

Our analysis of the 2 most recent NHTS surveys suggests a statistically significant but small increase in active travel from 2001 to 2009, mainly due to more walking. From a transport perspective, the walk share of all trips rose, and the frequency, duration, and distance of walk trips per capita also increased. The same survey data were also used to estimate the prevalence of health-enhancing walking and cycling. Our analysis showed that the prevalence of walking at least 30 minutes per day—both with and without the 10-minute bout criterion—increased for the population as a whole but with considerable variation among subgroups. The increase in trips per capita and trip duration per capita contributed mainly to more walkers accumulating 30 minutes per day, without changes in the prevalence of any walking. Consistent with the results of the daily trip data for adults (aged 16 years or older), the weekly data in Figure 1 show only slight decreases in the prevalence of no walking for most groups but considerable increases in the prevalence of 5 or more walk trips per week. For the population as a whole, the prevalence of no walking fell from 34% to 33%, whereas the prevalence of 5 or more walk trips per week rose from 30% to 34%.

The NHTS surveys did not show a significant increase in cycling trip rates or prevalence on a national basis. This contrasts with the cycling boom reported by some American cities over the last 2 decades.[26–29] The likely explanation is that cycling growth has been concentrated in a few regions and in the gentrifying central neighborhoods of a few metropolitan areas. Cycling levels in the South and in suburbs throughout the country remain extremely low.[15,16,27]

Changes in active travel between 2001 and 2009 were not equally distributed across population subgroups. Active travel declined significantly among children, seniors, and women In contrast, there were increases in the prevalence of walking 30 minutes per day for men, the age group 25–64 years, the employed, the well educated, and people without a car. In both 2001 and 2009, the prevalence of walking 30 minutes per day was higher among Hispanics, African Americans, and Asians than among Whites. Active travel by minorities may help offset their lower levels of leisure time physical activity compared with Whites.[30]

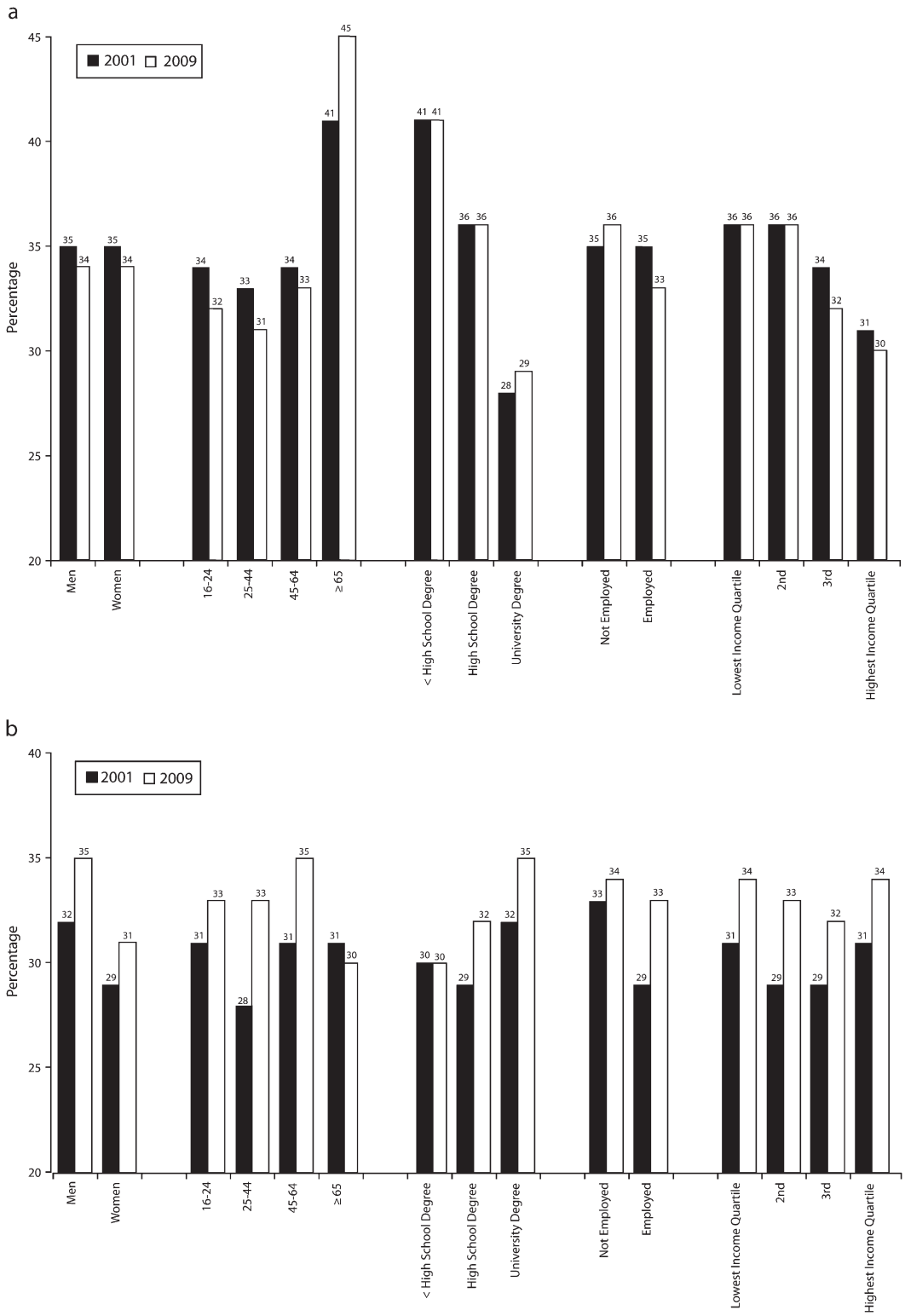
Our analysis confirms the important role of public transport in encouraging active travel.

TABLE 3—Prevalence of 30 Minutes Walking per Day and 30 Minutes Cycling per Day by Population Subgroup in the United States: National Household Travel Survey, 2001 and 2009

	2001			2009		Percentage Point Change 2001–2009	
Demographic	No.	30 Min Walking, % (95% CI)	30 Min Cycling, % (95% CI)	No.	30 Min Walking, % (95% CI)	30 Min Cycling, % (95% CI)	30 Min Walking	30 Min Cycling
All	148 616	7.2 (6.9, 7.4)	0.9 (0.8, 1.0)	308 901	8.0 (7.7, 8.3)	0.9 (0.8, 1.1)	+0.8*	0.0
Sex								
Male	70 644	6.6 (6.2, 6.9)	1.3 (l.1, 1.4)	143 223	7.7 (7.3, 8.2)	1.5 (1.3, 1.7)	+1.1*	+0.2
Female	77 970	7.8 (7.4, 8.2)	0.5 (0.4, 0.6)	165 771	8.2 (7.8, 8.6)	0.4 (0.3, 0.5)	+0.4	–0.1*
Age group, y								
5–15	24 139	7.5 (6.8, 8.1)	2.4 (2.1, 2.7)	38 141	7.1 (6.4, 7.8)	1.6 (0.4, 1.9)	–0.4	–0.8*
16–24	13 268	6.7 (5.9, 7.5)	0.6 (0.4, 0.9)	19 389	7.5 (6.6, 8.4)	0.8 (0.6, 1.1)	+0.8	+0.2
25–44	42 883	7.1 (6.6, 7.6)	0.7 (0.6, 0 9)	52 958	8.7 (8.1, 9.4)	0.9 (0.7, 1.1)	+1.6*	+0.2
45–64	43 724	7.3 (6.9, 7.8)	0.5 (0.4, 0.7)	112 415	8.9 (8.4, 9.5)	0.9 (0.7, 1.1)	+1.6*	+0.4*
≥65	24 634	7.4 (6.8, 8.0)	0.3 (0.2, 0.5)	86 113	6 0 (5.5, 6.4)	0.5 (0.4, 0.7)	–1.4*	+0.1
Education								
Less than high school degree	15 140	7.0 (6.2, 7.8)	0.6 (0.4, 0.9)	20 311	7.9 (6.9, 9.0)	0.9 (0.6, 1.4)	+0.9	+0.3
High school degree	45 326	6.1 (5.8, 6.4)	0.4 (03-0.5)	145 963	6.7 (6.3, 7.1)	0.5 (0.4, 0.6)	+0.6*	+0.1*
University degree	27 868	9.5 (8.9, 10.0)	1.0 (0.8, 1.2)	94 853	10.7 (10.0, 11.4)	1.3 (1.1, 1.5)	+1.2*	+0.3*
Working status								
Employed	84 155	6.4 (6.1, 6.7)	0.7 (0.6, 0.8)	139 489	8.0 (7.6, 8.4)	0.9 (0.8, 1.1)	+1.6*	+0.2*
Not in work force or unemployed	46 948	8.5 (8.0, 9.0)	0.5 (0.4, 0.6)	131 489	8.4 (7.9, 9.0)	0.6 (0.5, 0.8)	–0.1	+0.2
No. of cars								
No cars	6178	20.6 (18.9, 22.5)	1.1 (0.7, 1.7)	9753	25.8 (23.5, 28.3)	1.3 (0.9, 1.9)	+5.2*	+0.7
1	29 096	9.3 (8.7, 10.0)	0.7 (0.5, 0.8)	58 708	8.5 (7.9, 9.2)	0.9 (0.7, 1.1)	–0.8	+0.2
2	65 436	6.0 (5.7, 6.4)	1.0 (0.9, 1.1)	134 090	6.9 (6.5, 7.3)	1.0 (0.9, 1.2)	+0.9*	0.0
≥3	47 906	5.1 (4.7, 5.5)	0.9 (0.7, 1.1)	106 365	5.5 (5.1, 5.9)	0.8 (0.7, 0.9)	+0.4	–0.1
Urban versus rural								
Urban	108 652	8.0 (7.8, 8.4)	1.0 (0.9, 1.1)	216 479	9.1 (8.7, 9.5)	1.0 (0.9, 1.2)	+1.1*	+0.1
Rural	39 964	4.2 (3.8, 4.6)	0.7 (0.6, 0.9)	92 535	4.4 (4.0, 4.8)	0.6 (0.5, 0.7)	+0.2	–0.1
Day of the week								
Weekday	107 973	7.6 (7.3, 7.9)	0.8 (0.7, 0.9)	220 657	8.2 (7.9, 8.6)	1.0 (0.9, 1.1)	+0.6*	+0.1
Weekend	40 643	6.2 (5.8, 6.7)	1.0 (0.9, 1.2)	88 359	7.2 (6.7, 7.8)	0.8 (0.6, 1.0)	+1.0*	–0.2*
Race/ethnicity								
White	123 637	6.5 (6.3, 6.8)	1.0 (0.9, 1.1)	263 552	7.3 (7.0, 7.6)	1.0 (0.9, 1.1)	+0.8*	0.0
Hispanic	4434	10.5 (9.2, 12.0)	0.6 (0.4, 1.1)	9650	8.4 (6.0, 11.8)	0.9 (0.5, 1.6)	–2.1	+0.3
African American	7165	9.0 (8.1, 10.1)	0.5 (0.3, 0.7)	17 511	9.2 (8.2, 10.5)	0.7 (0.5, 1.2)	+0.2	+0.2
Asian	4859	9.4 (7.6, 11.5)	0.7 (0.3, 1.4)	7012	9.3 (7.7, 11.3)	0.8 (0.5, 1.3)	–0.1	+0.1
Income quartiles								
Lowest	35 491	8.3 (7.8, 8.9)	0.8 (0.6, 1.0)	66 630	9.7 (9.0, 10.4)	0.8 (0.6, 1.0)	+1.4*	0.0
Second	35 210	6.1 (5.7, 6.6)	0.9 (0.8, 1.2)	80 386	6.6 (6.0, 7.1)	0.8 (0.7, 1.0)	+0.5	–0.1
Third	30 761	6.3 (5.8, 6.8)	1.0 (0.8, 1.2)	73 458	7.6 (7.0, 8.1)	1.0 (0.8, 1.2)	+1.3*	0.0
Highest	36 674	7.2 (7.1, 8.1)	1.0 (0.8, 1.2)	67 978	8.2 (7.7, 8.8)	1.3 (1.0, 1.5)	+1.0	+0.3

Note. CI = confidence interval. Respondents aged 5 years and older
*$P < .05$.

With 90% of all public transport trips involving walk trips at both ends, policy packages for encouraging active travel should include safe and convenient pedestrian access to public transport stops. Cycling also has the potential to be an important access mode to public transport, as indicated by the 29% of suburban rail trips in The Netherlands combined with cycling for station access.[31] The low level of bike and ride trips in the United States (3% of all public transport trips) is partly due to insufficient bike parking at rail stations and the lack of good



Note. Respondents aged 16 years and older.

FIGURE 1—Changes in prevalence of walk trips per week from 2001 to 2009, by population subgroup for (a) no walk trips and (b) 5 or more walk trips: National Household Travel Survey, 2001 and 2009.

cycling facilities leading to stations.[32] Thus, one focus of cycling infrastructure policy should be the provision of secure, sheltered bike parking at stations and explicit coordination of bike paths and lanes with public transport stops.[26]

Limitations

The NHTS surveys have some important limitations. Because the interviews were restricted to landline telephones, they missed the increasing proportion of Americans with only cell phones, but the post-stratification weighting procedure was designed to minimize any resulting biases. The lower response rate in 2001 compared with 2009 may also cause concern, but again, the post-stratification weighting procedures corrected for nonresponse by using a wide range of demographic and socioeconomic indicators to ensure representation of the population. As with any self-report survey data, there may be measurement bias in respondent estimation of time and distance of trips, but that is not likely to have changed between the 2001 and 2009 surveys. NHTS interviewers specifically asked respondents about unusual estimates of trip duration and distance, but if respondents insisted, their answers were accepted. For the travel day estimates, the randomly selected travel day may have been atypical for some households, but were probably reasonable as population estimates.

Finally, the 2009 survey results may have been influenced by the sharp rise in gasoline prices in the United States in the spring and summer of 2008, including 5 of the survey months.[33] The temporarily high gasoline prices may have discouraged car use and encouraged more walking, cycling, and public transport use.[34,35] Moreover, the economic recession during most of the survey period may have influenced travel behavior.[36] Thus, the small increases in walking observed between 2001 and 2009 might not be a long-term trend.

Conclusions

The increase in walking reported by the NHTS provides hope for further growth. American cities have a long way to go to catch up to walking and cycling levels in Europe, which are about 3 to 5 times higher than in the United States.[2,37,38] As shown by recent studies, it is necessary to implement a comprehensive, integrated package of policies and programs to increase walking and cycling.[26,39–41] The necessary measures include improved infrastructure, such as sidewalks, crosswalks, bike paths and lanes, and intersection crossings; improved traffic education; strict enforcement of traffic regulations; reductions in motor vehicle speed limits; traffic calming of residential neighborhoods; and land use policies that foster compact, mixed-use developments.

In designing the right mix of policies, it will be important to target women, children, and seniors, who are the most vulnerable pedestrians and cyclists and require special attention to protect them from the dangers of motor vehicle traffic. Improved infrastructure for walking and cycling should be combined with educational and promotional programs to help encourage the necessary behavior change toward a more active lifestyle.[15,42] Individualized marketing schemes may be especially useful for focusing on particular groups, and a recent review documented their significant impacts on cycling levels.[43] ■

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Contributors

J. Pucher initiated the research, coordinated the overall project, and led the writing of the article. R. Buehler had primary responsibility for the data analysis and created the tables and figures. D. Merom and A. Bauman conceptualized the public health analysis of transport data, reviewed the public health literature, and provided guidance in study design and data analysis. All the authors participated in interpreting the findings and reviewing successive drafts of the article.

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Human Participant Protection

No protocol approval was required because the study relied entirely on publicly available data sets from national surveys.

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