

**RESULTS OF THE 2008-09
CAMPUS TRAVEL SURVEY**

Institute of Transportation Studies

and

Transportation and Parking Services

University of California, Davis

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EXECUTIVE SUMMARY

About the Campus Travel Survey

The campus travel survey is a joint effort by the Transportation & Parking Services (TAPS) on campus and the Sustainable Transportation Center, part of the Institute of Transportation Studies at UC Davis, meant to be administered annually each fall by a graduate student at the Institute of Transportation Studies. The main purpose of the survey is to collect annual data on how the UC Davis community travels to campus, including mode choice, vehicle occupancy, distances traveled, and vehicle/bicycle parking. It also offers an opportunity for TAPS to assess awareness of campus transportation services and perceptions of mobility options. This year's survey is the third administration of the campus travel survey, which was first administered in the spring of 2006-07 as a pilot effort.

The 2008-09 survey was administered online in October 2008, distributed by email to a stratified random sample of 14,031 students, faculty, and staff. About 30 percent (4,133 individuals) responded to this year's survey, with about 26 percent actually completing it. For the statistics we present throughout this report, we weighted the responses by role group (freshmen, sophomore, junior, senior, master's student, PhD student, faculty, and staff) so that the proportion of respondents in each group reflects their proportion in the campus population.

Main findings

Mode split

We estimate that about 92 percent of the campus community travels to campus or works from home on an average weekday. Among these, about 40 percent bike to campus, 32 percent arrive by private vehicle, 21 percent ride public transit, 6 percent walk or skate, and 1 percent work from home (Figure 1). These figures represent the percent of travelers using this mode for most of their trip to campus (the portion taking up the greatest time or distance) on an average weekday.

Figure 1. Overall mode split 2008-09

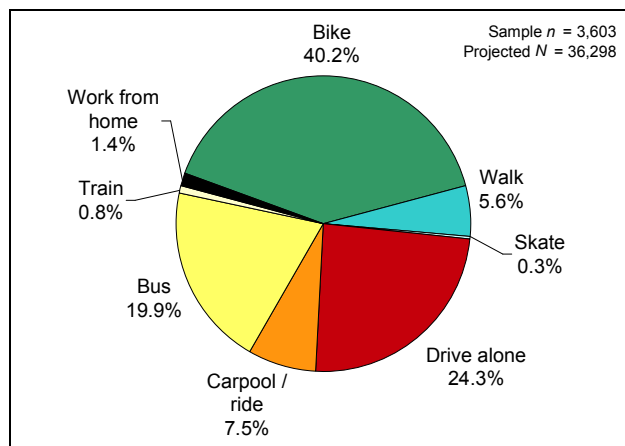


Figure 2. Overall mode split 2007-08

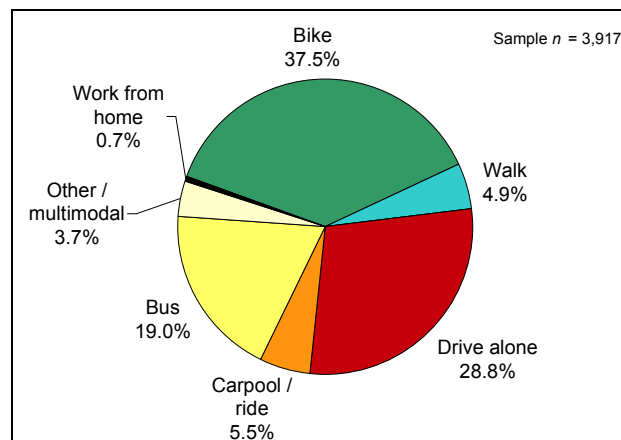


Table 1. Change in mode split, 2008-09 versus 2007-08

Role group	Bike	Drive alone	Carpool	Bus	Walk	Work from home
Undergraduates	5.4%	-4.7%	-0.7%	1.5%	1.4%	n/a
Grad students	-4.4%	4.7%	0.2%	-0.6%	-0.8%	n/a
Faculty	0.6%	-1.8%	-0.3%	0.8%	1.0%	0.2%
Staff	-0.5%	-3.3%	4.5%	1.1%	-0.5%	0.9%
Overall	2.7%	-3.0%	0.5%	0.9%	0.7%	0.8%

Statistically significant difference with $p < 0.1$ in a two-category χ^2 test of the frequency of those using this mode versus those using any other mode in 2007-08 versus 2008-09.
 Statistically significant at $p < 0.05$.

A comparison of findings from the 2008-09 and 2007-08 surveys show a statistically significant increase in the percent biking (up about 3 percent) and a decrease in the percent driving alone (down about 3 percent) between the fall 2007 and fall 2008 surveys, mostly among undergraduates (Figure 1, Figure 2, and Table 1). Among staff, there was also a statistically significant increase in carpooling, up about 5 percent between 2007 and 2008.

An examination of mode choice by role group shows substantial variation across classes. In particular, while the overwhelming majority of freshmen (74 percent) report using bikes, this percentage drops substantially among sophomores (43 percent), perhaps associated with their move off campus (Figure 3). This trend is similar to that observed in the 2007-08 survey, though somewhat less pronounced, with substantially more sophomores still using bikes in 2008 compared with 2007.

Meanwhile, the percent of undergraduates relying on private vehicles to get to campus (either driving alone, carpooling, or getting a ride by someone who dropped them off) increases steadily over the four class years (Figure 4). Employees are most reliant on private vehicles, with about 71 percent of staff and 47 percent of faculty driving or getting a ride on an average weekday.

Figure 3. Bike mode share 08-09 and 07-08, by role

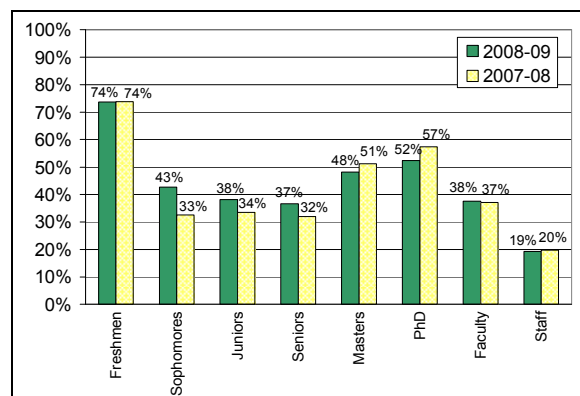


Figure 4. Private vehicle mode share, 08-09 and 07-08, by role

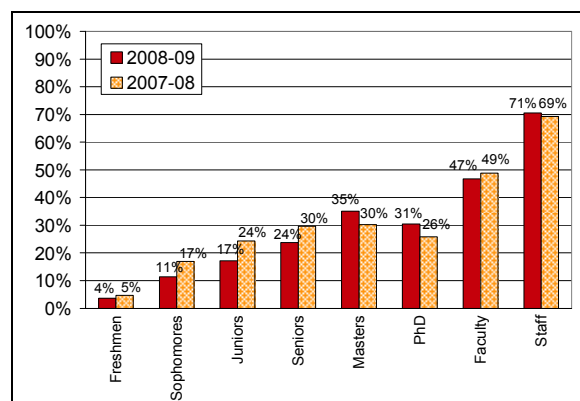


Figure 5. Mode split from within Davis, 08-09

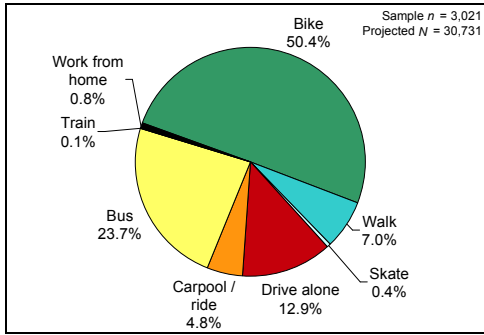


Figure 6. Mode split among students from within Davis, 08-09

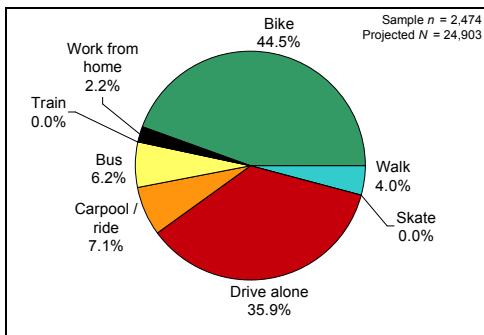


Figure 7. Mode split among employees from within Davis, 08-09

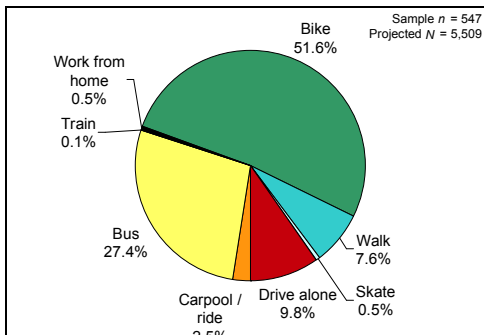
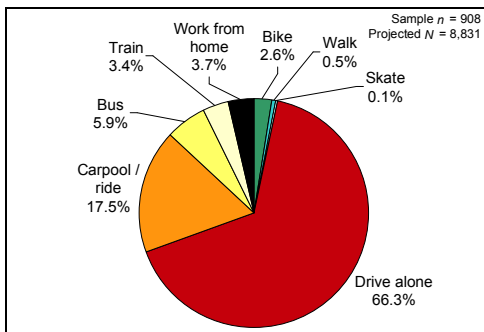


Figure 8. Mode split from outside Davis, 08-09



Focusing just on the mode split among those traveling from within Davis (estimated to be about 76 percent of the campus population or 24,900 people, including 88 percent of students, 66 percent of faculty, and 42 percent of staff), about half bike to campus (Figure 5). The modes chosen by those living within Davis who do not bike vary substantially by role group (Figure 6 and Figure 7). Students, especially undergraduates, are more likely to take the bus (27 percent of students versus 6 percent of employees), while employees are more likely to arrive by car (43 percent among employees, versus 12 percent among students).

Of those traveling from outside Davis (about 24 percent of the campus population, or 8,800 people), the overwhelming majority (84 percent) arrives by car on the average weekday. About three-quarters of these drive alone to campus, while the remaining share carpool with at least one other person or get a ride.

Carpooling and vehicle occupancy

Among those traveling to campus (or working from home) on an average weekday, we estimate about 32 percent arrive by private vehicle (about 11,540 people), either driving alone or carpooling. Among these, about 76 percent drive alone, 18 percent carpool, and 5 percent get a ride with someone who drops them off. Among those who carpooled at any point during the reference week, the average number of passengers was 2.59 (including the driver). Most people who were dropped off on campus by a driver who continued on elsewhere were the sole passenger dropped, with an average of 1.33 passengers (excluding the driver) arriving per vehicle.

Based on the numbers of passengers respondents reported, we can estimate the total number of vehicles arriving on campus on an average weekday, counting one vehicle for each person driving alone, and a partial vehicle proportionate to the number of occupants in vehicles with more than one person. Projecting our findings to the whole population, we estimate that about 10,313 vehicles arrive on

campus each day, or about 3.84 vehicles per person affiliated with the Davis campus (Figure 9). Among these, 82 percent (8,429 vehicles) report parking on campus, 9 percent (932 vehicles) park off campus, 5 percent (494 vehicles) drop passengers off without parking, and 4 percent (459 vehicles) did not report where they parked (no response or “other” in response to this question after indicating vehicle use in a prior question).

Average vehicle ridership (AVR, as calculated by the South Coast Air Quality Management District) is roughly a ratio of the number of person-arrivals to vehicle-arrivals on campus over a five-day workweek. If everyone drove by themselves to campus, the campus AVR would be 1.0; and so higher AVR values (greater than 1.0) indicate more carpooling and/or use of alternative modes of transportation. Campus-wide AVR for 2008-09 (including both on and off-campus residents, students and employees) is estimated to be 3.51, up slightly from 3.20 in 2007-08 (Table 2). This is roughly 3.51 person-arrivals for every vehicle arriving on campus. Excluding on-campus residents and students, the AVR in 2008-09 is estimated to be 1.69 in 2008-09 (compared with 1.67 in 2007-08).

Distances traveled

Based on the minimum network distance between respondents’ reported residential locations and campus, we estimate that the average distance traveled to campus is about 6.6 miles overall; and 3.6 miles among undergraduates, 7.8 miles among graduate students, 12.0 miles among faculty, and 12.1 miles among staff. Distances are much greater, once beyond the city limits of Davis with an average of just 1.8 miles traveled from within Davis and 23.3 miles for those traveling from outside of Davis. Undergraduates are most likely to live close by, with 86 percent living within 3 miles of campus, compared with 70 percent of graduate students, 48 percent of faculty, and 34 percent of staff (see Figure 10).

Figure 9. Projected number of vehicles arriving on campus on an average weekday, by occupancy

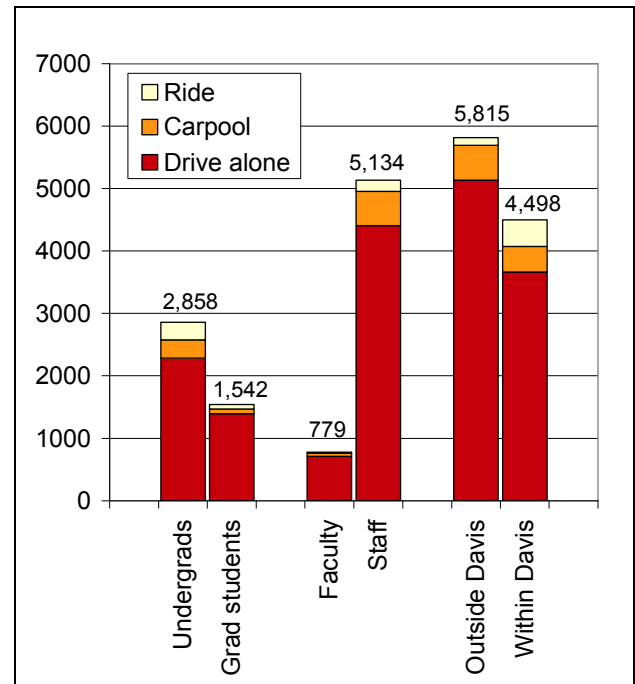


Table 2. Average Vehicle Ridership, 07-08 and 08-09

Role group	Overall AVR	
	2007-08	2008-09
Freshmen	26.39	33.40
Sophomores	6.78	10.67
Juniors	4.46	6.56
Seniors	3.77	4.67
Masters	3.49	2.94
PhD	4.20	3.36
Faculty	2.23	2.35
Staff	1.58	1.62
Student	5.04	5.91
Undergraduates	5.04	7.37
Graduate students	3.94	3.21
Employees	1.67	1.71
Outside Davis	1.33	1.33
Within Davis	5.61	6.32
Overall	3.20	3.51

Figure 10. Projected number of people traveling from various distances, by role group

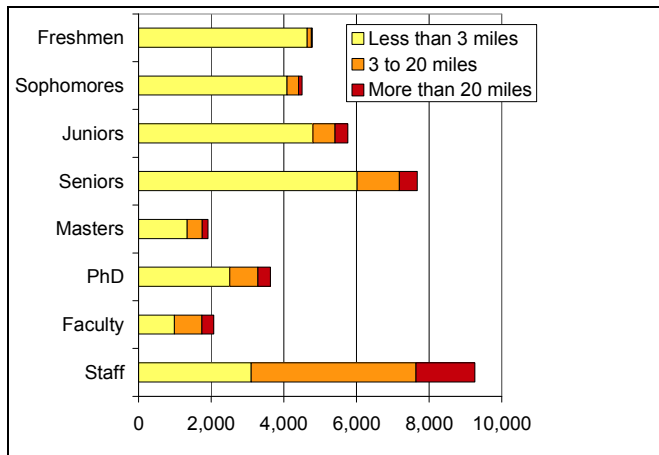
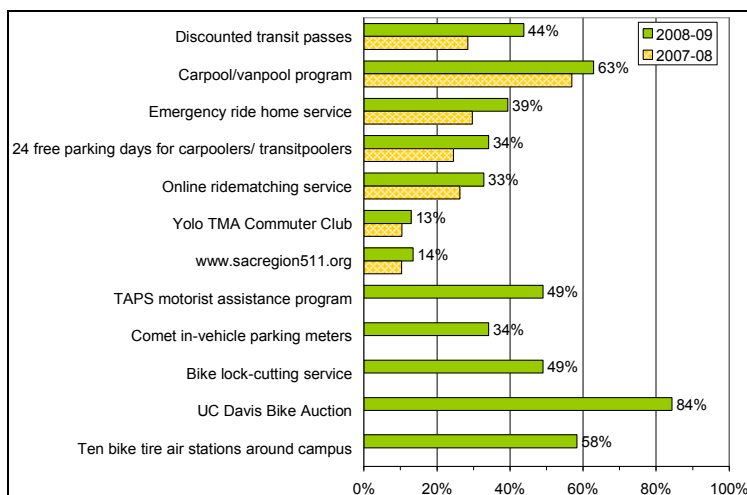


Figure 11. Percent who have heard of each service, 08-09 and 07-08



VMT and carbon emissions

Based on distance from campus, mode choice, and vehicle occupancy, we generate rough estimates of the total number of vehicle-miles traveled (VMT) on the way to and from campus on an average weekday, as well as the carbon emissions associated with this travel. We estimate that the campus community covers about 425,000 miles per day roundtrip, generating about 279,000 vehicle-miles of travel (). This generates approximately 9 pounds equivalent of carbon per person daily, ranging from 0.9 pounds per freshman to 19.1 pounds per staff person, or 30.3 pounds, on average, among those driving alone to campus.

Awareness of TAPS and other transportation services

Respondents were presented a list of services and asked to indicate for each, “It’s new to me,” “I’ve heard of it, but never used it,” or “I’ve used it.” Awareness of services appears somewhat higher in 2008-09 compared with 2007-08, as shown in Figure 11.

Table 3. Miles traveled and carbon emissions

Role group	People	Generated daily (on an average weekday)				
		Aggregate person-miles	Aggregate vehicle-miles	Lbs. equiv. of CO2	Lbs. CO2 per person-mile	Lbs. CO2 per person
Undergraduates	22,612	138,162	69,613	107,448	0.78	4.75
Grad. Students	5,562	65,527	38,005	49,534	0.76	8.91
Faculty	2,079	29,642	18,234	23,005	0.78	11.07
Staff	9,309	191,623	153,029	177,451	0.93	19.06
Total	39,562	424,954	278,881	357,438	0.84	9.03

INTRODUCTION

About the campus travel survey

The campus travel survey is a joint effort by the Transportation & Parking Services (TAPS) on campus and the Sustainable Transportation Center, part of the Institute of Transportation Studies at UC Davis, meant to be administered annually each fall by a graduate student at the Institute of Transportation Studies. The main purpose of the survey is to collect annual data on how the UC Davis community travels to campus, including mode choice, vehicle occupancy, distances traveled, and vehicle/bicycle parking. It also offers an opportunity for TAPS to assess awareness of campus transportation services and perceptions of mobility options.

This year's survey is the third administration of the campus travel survey. The survey was first administered in the spring of 2006-07 as a pilot effort, with a second survey conducted in the fall of 2007-08 (see Congleton 2009).

Development of the survey instrument

The content of the survey was based on the 2007-08 survey, retaining key questions relating to mode choice, residential location, and the roles of participants. An ongoing attempt to refine question wording has meant that some variables are not directly comparable across years. (See Appendix A for a copy of the full 08-09 survey instrument and Appendix B for an overview of differences in the questions about mode choice between the 08-09 and 07-08 surveys.) In addition to core measures intended to be included annually, this year's survey included additional questions focusing on the following topic areas:

- Extent and reasons for leaving bikes on campus overnight (questions *Q0061* through *Q0067*)
- Where cyclists have acquired their bikes (questions *Q0019*, *Q0060*, and *Q0063*)
- Measure of crashes across modes (bike, walk, drive/ride; questions *Q0069* through *Q0071*)
- Multitasking during the commute trip (question *Q0021*)
- Interest in campus-based bike sharing and car sharing (questions *Q0077* through *Q0082*)

The online survey was prepared using the Lime Survey software (<http://www.limesurvey.org/>), hosted on a server at the Institute of Transportation Studies administered by Ning Wan. A sample screenshot of the online appearance of the survey is shown in Appendix A, followed by a full (text-based) copy of the survey instrument.

Staff at TAPS, at the Office of Resource Management and Planning, at Student Affairs Research and Information, as well as faculty, staff, and students affiliated with the Institute of Transportation Studies provided feedback on survey content, and assisted with pre-testing the online survey.

Sampling procedure

The goal of the sampling procedure was to draw a sufficiently large sample for reliable statistical estimates within the following groups: freshmen, sophomores, juniors, seniors, master's/professional students, PhD students, faculty, and staff. We based our assumptions about the total number in each of these groups on the 2007-2008 three-quarter averages generated by the Office of Resource Management and Planning (shown in the first column of Table 4). We used standard statistical

techniques to determine the minimum sample size needed for estimates with a +/- 5% margin of error.¹ We then assumed a 20-percent response rate within each strata (shown in the second column of Table 4). The number recruited to participate in the study comprised about 35 percent of the overall campus population, including 20 percent of staff, 78 percent of faculty, and 37 percent of students, and totaling 14,031 people overall.

A stratified random sample was drawn from ostensibly complete lists of UC Davis email addresses maintained at two different departments within the university. The sampling of student email addresses was conducted by the Student Affairs Research and Information office. Student addresses were screened based on students' level and departmental affiliation, including all academic and professional students except medical students, who are not based on the Davis campus. The sample of employee (faculty and staff) email addresses was drawn by Data Administration staff using the Campus Data Warehouse. Employees were screened to exclude those affiliated with the Medical Center or field stations, those without salary, Emeritus faculty, Extension School faculty, temporary employees, and employees without email addresses. In each case, the respective offices drew the sample and submitted to Kristin Lovejoy an Excel spreadsheet containing only those names and email addresses of individuals selected for inclusion in the sample.

Table 4: Sampling and response rate

Role group	Campus population ^a	2008-09 Survey				Response rate 2007-08 Survey ^f
		Invited	Responses (at Q0001) ^e	Response rate (at Q0001) ^e	Response rate (at Q0084) ^e	
Freshmen	4,597	1,774	474	26.7%	22.3%	26.3%
Sophomores	4,498	1,771	413	23.3%	20.6%	21.8%
Juniors	5,796	1,802	440	24.4%	21.5%	21.4%
Seniors ^b	7,721	1,831	360	19.7%	17.1%	20.2%
Masters students ^c	1,926	1,657	338	20.4%	18.0%	19.1%
PhD students ^d	3,636	1,738	704	40.5%	35.3%	28.2%
Faculty	2,079	1,622	558	34.4%	29.6%	37.0%
Staff	9,309	1,846	846	45.8%	39.2%	49.8%
Total	39,562	14,031	4,133	29.5%	25.5%	28.0%

^a Population figures are 2007-2008 three-quarter averages provided by the Office of Resource Management and Planning.

^b Includes senior and post-baccalaureate (teaching credential) students.

^c Includes all academic-program masters students, plus professional-program students in Masters of Law, JD, MBA (full time and working professional program), Forensic Science, Masters of Advanced Study, and Master of Preventative Vet Med. Excludes all School of Medicine students.

^d Includes all academic-program doctoral (D1 and D2) students, plus professional-program students in Veterinary Medicine (DVM). Excludes all School of Medicine students.

^e Includes valid responses through question Q0001 and question Q0084 of the survey, respectively.

^f As reported in Congleton (2009).

¹ For each strata, the minimum sample size, n , was calculated as $n = \frac{z_{\alpha/2}^2 S^2}{e^2 + \frac{z_{\alpha/2}^2 S^2}{N}}$, where N is the total population, S^2

is the population variance, $z_{\alpha/2}$ is the $(1-\alpha/2)^{\text{th}}$ percentile of the standard normal distribution for degree of certainty $1-\alpha$, and e is the acceptable margin of error of the estimate (Lohr 1999, p. 40). This formula assumes a two-sided test and includes a finite population correction. We assumed $S^2=0.25$ (since a binary variable assuming a given value with probability p has maximum $S^2 \approx p(1-p)$ when $p=0.5$); we assumed acceptable margin of error of +/-5% ($e=0.05$); and we aimed for 95% confidence level ($\alpha=0.05$ or $z_{\alpha/2} \approx 1.96$). Values of N used were those shown in Table 6.

Survey administration and recruitment of participants

We invited students, faculty, and staff in our sample to participate in the survey via email to their UC Davis addresses. Members of the sample were sent at most two emails, an initial email and a follow-up email approximately one week later. All emails were sent from the address “travelsurvey@ucdavis.edu,” which was set to forward to Kristin Lovejoy’s UC Davis email account.² The initial email invitation was sent via bulk mail to all recipients at once with the assistance of the UC Davis Postmaster. After finding that response to the initial launch overwhelmed the web server hosting the survey, we decided to send the follow-up email by hand (using the alias travelsurvey@ucdavis.edu via Kristin Lovejoy’s account) in staggered batches of approximately 200 at a time.

The initial email was sent to all members of the sample at about 10AM on Thursday, November 6, 2008, officially launching the survey. We then sent members of the sample a second follow-up email at some point during the day either on Monday (November 10) or Wednesday (November 12) if they had not yet completed the survey as of midnight the night before, as determined by entry of an exact UC Davis email addresses into one of the last questions of the survey. Matches between these and the emails in the initial recruitment list were identified using Microsoft Access and used as the basis for removing respondents from the list, with about 2550 successful matches. In total, about 9880 members of the sample were sent reminders on November 10, with approximately 200 email reminders sent every 15 minutes between 7:45AM and 7:45PM. At about 7:45PM, Gmail shut down Kristin’s account, and the remaining 1,600 reminders were withheld until Wednesday, November 12 (since Tuesday, November 11 was the Veteran’s Day holiday). The remaining 1600 reminders sent on Wednesday were all to students, as all reminders to faculty and staff had been prioritized to be sent prior to 6PM on Monday.

In both the initial and the follow-up recruitment emails, recipients were notified of the opportunity to be entered into a drawing to win one 8GB iPod Nano upon completing the survey. Faculty and staff recipients were addressed “Dear UC Davis Employee” and students were addressed “Dear UC Davis Student.” The follow-up email included language apologizing for technical difficulties in the initial launch (described in detail below) and encouraging respondents to try again. Copies of both recruitment letters are in Appendix C.

TAPS allocated \$150 for incentives to participate in the survey, down from past years due university-wide budget concerns. We decided against offering a cash prize because legal issues make it difficult for the university to do so. We wanted to offer something that would be comparably appealing to employees and students, as well as something that was neutral with respect to individuals’ transportation choices. We settled on an iPod, which was also one of several prizes offered in the 2007–2008 survey. We opted for the 8GB iPod Nano, since it fit the \$150 price point and because Apple’s iPod products are thought to be desirable. Entry into a drawing for the iPod was mentioned in the initial and follow-up recruitment emails, as well as on the first welcome page of the online survey, where the mention of the iPod was hyperlinked to the section of Apple’s website featuring this product.

We conducted the drawing using the email addresses participants gave upon completing the survey.

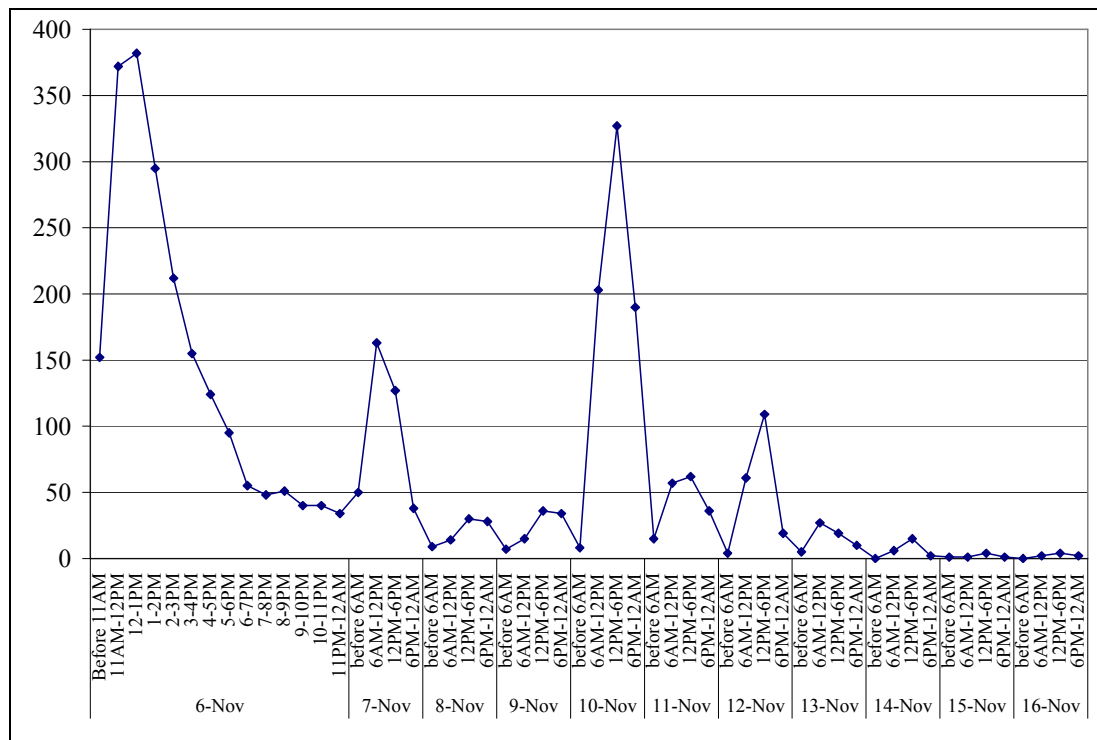
² A technical problem prevented mails sent to travelsurvey@ucdavis.edu from forwarding to Kristin Lovejoy’s email account the first day of the survey launch, November 6. In particular, anyone attempting to send mail to the address travelsurvey@ucdavis.edu during the day on November 6, including anyone attempting to reply to the email invitation, had their message bounce. This was a result of the migration from Geckomail to DavisMail that coincidentally occurred at approximately 9:45AM on November 6 for Kristin Lovejoy’s (student) email account, interfering with the forwarding of mails to her account from the survey account travelsurvey@ucdavis.edu. IT corrected this problem by November 7.

Thus, only respondents who completed the survey and entered an email address were included. Anyone who attempted the survey and found they were ineligible (based on the initial screening question *Q0003*, “Do you go to the Davis campus regularly, either for work or classes?”) had been forced to skip to the end of the survey, but was still invited to give an email address to enter into the drawing. In total, there were 3,779 non-missing entries of email addresses, although 113 of these respondents had opted out of the drawing. We generated random numbers for the remaining 3,666 address and then selected the one with the lowest value as the winner, who we notified via email on November 18, 2008 and issued the prize shortly thereafter.

Response rate and attrition

A total of 4,133 respondents at least commenced the survey (responding to question *Q0001*), with 3,577 completing through question *Q0084* (see a copy of the survey instrument in Appendix A). Minimum sample sizes were achieved within all strata except senior students (and master’s students by question *Q0084*), with response rates ranging from a high of 46 percent (39 percent by question *Q0084*) among staff to a low of 20 percent (17 percent) among seniors (see Table 4). The overall response rate was 30 percent (26 percent). A histogram showing the numbers of respondents completing the survey at a given hour over the course of the study period is shown in Figure 12 (note that incomplete surveys are not shown in this figure).

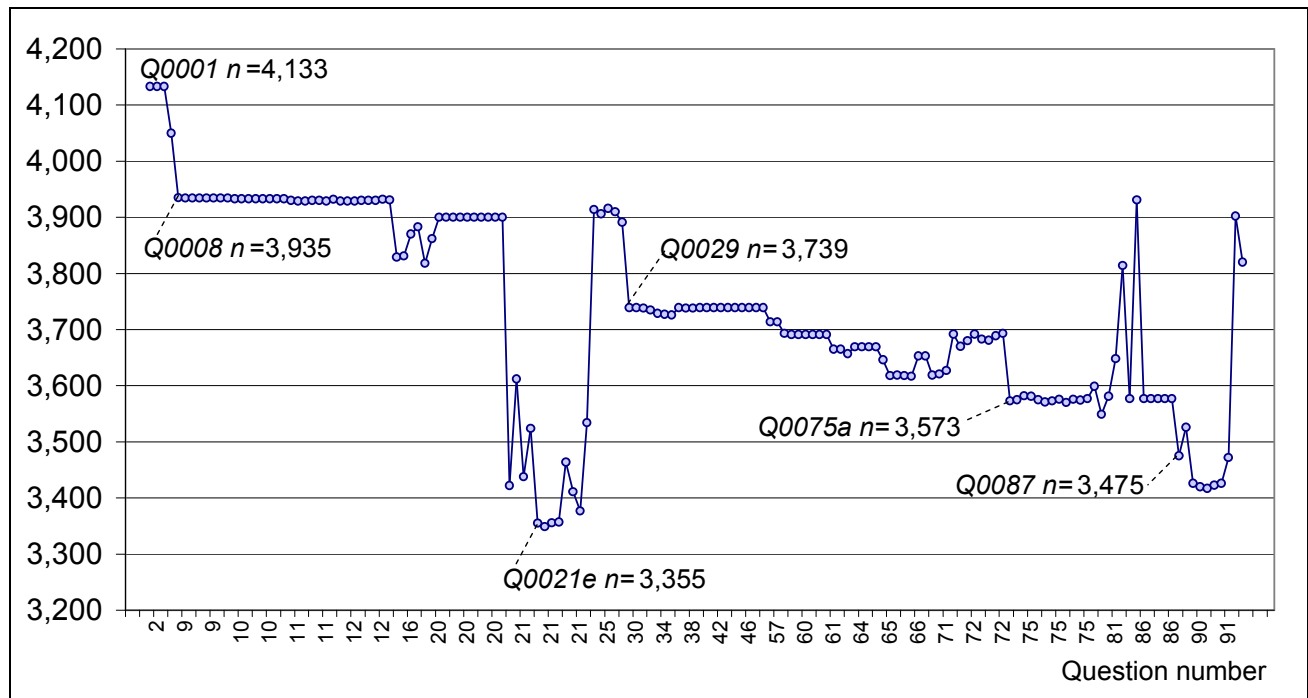
Figure 12. Frequency of completed surveys, November 7–17, 2008



It is likely that technical difficulties at least partially depressed overall response. In particular, response during the first hours after the survey launch on November 6 overwhelmed the web server hosting the survey, causing slow performance as well as some users’ inability to access the site altogether. By 12:30PM on November 6, approximately 540 respondents had started the survey but not finished, perhaps indicating that technical difficulties were encountered. Although this figure dipped to a low of

about 430 by the following morning, it seems that at least 400 started the survey but abandoned it during the first day of the launch, either due to technical difficulties or for other reasons. Responses by question number are shown in Figure 13. In particular, the numbers shown are 4133 minus the number of missing responses for a given question. (In this figure, if a respondent was not shown a question, then their response is not counted as missing; as a result, some questions shown to relatively few respondents have particularly high numbers valid responses.) Response was particularly low on the questions about multitasking activities people do during their trip to campus (*Q0021* series of questions). Questions *Q0085* (years at UC Davis) and *Q0092* (highest level of education) are particularly high because derived from role group among students.

Figure 13. Number of valid responses by question



In addition, it is presumed that other respondents may have tried to access the survey but failed to be able even to start it. For instance, according to web log files, there were approximately 1,500 people who attempted and failed to access the web server between 10:30 and 11:30AM on November 6. At approximately 12:30PM, we added a message to the first page of the survey stating, “Note: If your survey is loading slowly, please try back again a little later. We apologize for the inconvenience, and thank you for your patience.” This message was retained as part of the survey for the remainder of the study.

Because any emails or replies sent to the address “travelsurvey@ucdavis.edu” were bouncing throughout the day on November 6, rather than forwarding to Kristin Lovejoy’s email address as planned (see footnote 2), we expect that less feedback reached us than was attempted on the part of survey respondents. Even without the option of replying directly to the email invitation, approximately 20 survey respondents contacted one or all of Kristin Lovejoy, Susan Handy, and/or Cliff Contreras (the three names listed in the signature of the recruitment email, presumably reached by looking up their email addresses in the directory) to notify them of difficulties they encountered with the survey on November 6.

Screening respondents for eligibility

While incomplete survey responses were retained in the dataset, cases were excluded from the dataset based on two criteria. First, because we planned to weight the results by role group (freshmen, sophomore, junior, etc.), we excluded cases whose role could not be verified based on responses to questions *Q0001* and *Q0002*. Of the 226 cases with missing data for question *Q0002*, 211 could be recoded based on write-in descriptions in the “other field.” In particular, we chose to assign fifth-year students and one “international” student as seniors; law and MBA students as master’s students; veterinary students and Ed.D/CANDEL students as PhD students; and post-docs and visiting scholars as staff. Five of the remaining 15 cases (with missing data for both *Q0002* and *Q0002_other*) had email addresses entered, which we used to look up the individuals in the UC Davis directory, and assign a *Q0002* value based on the information listed.

Secondly, cases were excluded from the dataset if the respondent indicated that they did not regularly travel to campus, based on responses to *Q0003* and write-in responses to *Q0013* (“What was the main reason that you did not travel on campus last week?”), revealing they do not travel to campus regularly.

Ideally, we would have liked to include in the sample anyone who usually travels to campus regularly (including those temporarily elsewhere, such as on sabbatical or maternity leave), but exclude those whose main work is elsewhere. Unfortunately, question *Q0003* left it somewhat ambiguous as to what was meant by “regularly” as well as how those away for the quarter (or for some other temporary leave period) should respond. In total, 214 respondents reported that they do not travel to campus regularly. We did not ask these respondents more about their circumstances, and they may be some mix of people who always work elsewhere and people who are only away temporarily.

The sample frame we developed (that is, the email list from which a random sample was drawn by the Registrar and Data Warehouse for students and staff, respectively) was intended to only include those whose affiliation implies a location on the Davis campus. However, it is expected that some stationed off-campus would be included in the sample erroneously, either due to errors/misclassification or because the database has no way of identifying certain individuals’ off-campus locations. Therefore, despite the fact that the sample frame was intended to exclude these individuals, some of these 214 may be those who slipped through this screening. As mentioned above, others of the 214 may be undergoing some temporary situation keeping them away, such as sabbatical, field work, semester abroad, or family leave. In addition to these 214 answering “no,” to *Q0003*, among those who respond “yes” to *Q0003*, 97 reported that they did not travel to campus at all during the reference week, and 13 of these revealed in *Q0013_other* that this was because they do not actually regularly work on campus, traveling to campus once per month or less. We chose to exclude these from the sample as well. (However, we retained in the sample those who indicated that they were away temporarily, such as for sabbatical, bereavement leave, study abroad, or a joint teaching appointment at another UC campus.)

Sociodemographic composition of respondents completing the survey

Table 5 shows sociodemographic characteristics of the unweighted sample. The sample includes more female than male respondents. This means that males are underrepresented among student respondents, especially undergraduates, though somewhat overrepresented among employee respondents. In particular, females comprise about 66 percent of the sample compared with 56 percent of the population of undergraduates; 57 percent of respondents versus 51 percent of the population of graduate students; and 52 percent of respondents versus 59 percent of the population of employees.³

³ Figures for the composition of the campus population by gender are drawn from “Student Headcount by Gender, Fall

For the purposes of analysis, we assume that respondents are roughly similar to the rest of the population within their role group (freshmen, sophomore, etc.) with respect to these attributes and others that may matter for transportation choices. For this reason, we weight the sample by role, as described below.

Table 5. Sociodemographic characteristics of survey respondents

Characteristic	Role group			
	Undergraduates	Grad students	Employees	All
Gender: valid <i>n</i>	1460	913	1204	3577
% male	34.0%	43.2%	48.2%	41.1%
Age: valid <i>n</i>	1420	898	1154	3472
% < 20 years old	69.9%	0.1%	0.4%	28.7%
% 20 to 29 years old	29.2%	75.6%	12.5%	35.6%
% 30 to 39 years old	0.6%	20.4%	22.2%	12.9%
% 40 to 49 years old	0.1%	2.6%	26.6%	9.6%
% 50 to 59 years old	0.1%	1.1%	26.2%	9.0%
% 60+ years old	0.2%	0.2%	12.1%	4.2%
Household size: valid <i>n</i>	1424	910	1192	3562
% alone	4.9%	17.5%	13.2%	10.9%
% 2 people	21.7%	46.7%	40.2%	34.4%
% 3 to 5 people	55.5%	34.1%	44.6%	46.3%
% 6 or more people	11.0%	1.8%	1.9%	5.6%
% in a dormitory	6.9%	0.0%	0.1%	2.8%
Highest level of education: valid <i>n</i>	1687	1042	1173	3902
% High school or less	0.0%	0.0%	2.6%	0.8%
% Some college	100.0%	0.0%	7.4%	45.5%
% 2-year degree	0.0%	0.0%	4.6%	1.4%
% Bachelor's degree	0.0%	0.0%	20.3%	6.1%
% Some grad school	0.0%	32.4%	3.8%	9.8%
% Grad degree	0.0%	67.6%	61.2%	36.4%
Total household income: valid <i>n</i>	0	0	1091	n/a
\$0 - \$19,999	n/a	n/a	0.7%	n/a
\$20,000 - \$39,999	n/a	n/a	5.2%	n/a
\$40,000 - \$59,999	n/a	n/a	10.9%	n/a
\$60,000 - \$79,999	n/a	n/a	13.1%	n/a
\$80,000 - \$99,999	n/a	n/a	14.6%	n/a
\$100,000 - \$119,999	n/a	n/a	16.2%	n/a
\$120,000 - \$139,999	n/a	n/a	9.9%	n/a
\$140,000 - \$159,999	n/a	n/a	8.6%	n/a
\$160,000 - \$179,999	n/a	n/a	5.4%	n/a
\$180,000 - \$199,999	n/a	n/a	5.5%	n/a
Greater than \$200,000	n/a	n/a	9.8%	n/a
Total respondents (total <i>n</i>)	1687	1042	1404	4133

The statistics shown are unweighted, based on responses to survey questions *Q0084*, *Q0089*, *Q0091*, *Q0092*, and *Q0093*. Questions *Q0092* (education) and *Q0093* (income) were not asked of students. Percentages reported are among valid (non-missing) responses to each question.

2008,” “Employees by Gender and Ethnicity, Fall 2008,” and “Teaching Faculty by Gender, Fall 2008” available on the *UC Davis Facts* website, online at <http://facts.ucdavis.edu/>. These population counts include medical (non-Davis campus) affiliates who are excluded from the survey sample. In addition, the employee count includes employed students, who are not included as employees in the survey sample.

Weighting responses by role

Respondents were assigned role categories based on their responses to question *Q0001*, “What is your primary role on campus? (Faculty, Staff, Student)” and question *Q0002*, “Are you an undergraduate or graduate student? (Freshman, Sophomore, Junior, Senior, Master’s student, PhD student, Other).” We recoded 72 “Other” responses into the appropriate category as indicated by what respondents wrote in by hand, grouping 5th-year students with seniors; law and business students with Master’s students; and Ed. D and Vet Med students with PhD students. We also assigned categories to 5 respondents who had skipped responding to questions *Q0001* and/or *Q0002* by using the email addresses they gave to look up their role in the UC Davis directory. After these recodes, there was only 1 respondent with an unknown role excluded from the sample.

For all results presented in this report, responses are weighted to be representative of the campus population by role (freshmen, sophomores, juniors, seniors, master’s/profession students, PhD students, faculty, and staff). That is, we apply a weight factor to each case in a given role group so that the group’s proportion in the sample is the same as their proportion in the overall population. To accomplish this, the appropriate weight factor is a ratio of the population share to the sample share for each role group. That is, with N total population, n in the sample, and N_i in role group i in the population (for instance, freshmen), and n_i of role group i in the sample, we apply the weight factor $W_i = (N_i/N) / (n_i/n)$ to all cases in role group i . Applying the weight factors alters the apparent distribution of respondents by role, but the overall sample size is unchanged. In instances where we would like to expand the sample to a projection of the full population, we weight each case by an *expansion* factor E_i , equal to (N_i / n_i) . Applying the expansion factors alters both the distribution of respondents by role, and inflates the sample to the size of the population, or 39,562.

Although the number of valid responses varies from question to question (that is, n and n_i), we found that which n we use to come up with weight factors does not substantially influence the results for most variables. (For instance, generating weights based on the $n=3,935$ valid responses to question *Q0008* versus weights based on the $n=3,577$ valid responses to question *Q0075* causes only a small variation in the results, up to 0.1 percentage points. This is not surprising, to the extent that attrition is comparable across role groups.) Therefore we use the same set of weight factors for most variables, based on the distribution of roles among the $n=3,935$ valid responses to question *Q0008*, the first question among the core series of questions regarding travel to campus during the reference week. However, for variables relying on geocoding of respondents’ residential location, we generated a separate set of weight factors, based on the 3,451 cases successfully geocoded (by zip code and cross streets in given in questions *Q0050* and *Q0051* or *Q0087* and *Q0088*, or dorm name given in question *Q0005*; see Appendix E) and with non-missing mode data from question *Q0011*. Both sets of weights are shown in Table 6.

Table 6. Weight factors, applied by role

Role group (i)	Population (N)	Based on valid responses to question Q0008				Based on valid responses to question Q0011 and successful geocoding of home location			
		Valid responses (n)	Weight factor (N _i /N)/(n _i /n)	Expansion factor (N _i / n _i)	Weighted sample size	Valid responses (n)	Weight factor (N _i /N)/(n _i /n)	Expansion factor (N _i / n _i)	Weighted sample size
Freshmen	4,597	444	1.0298	10.3536	457.2	423	0.9480	10.8676	401.0
Sophomores	4,498	403	1.1101	11.1613	447.4	339	1.1574	13.2684	392.4
Juniors	5,796	419	1.3759	13.8329	576.5	353	1.4323	16.4193	505.6
Seniors	7,721	345	2.2260	22.3797	768.0	291	2.3144	26.5326	673.5
Masters	1,926	329	0.5823	5.8541	191.6	287	0.5854	6.7108	168.0
PhD	3,636	673	0.5374	5.4027	361.7	601	0.5277	6.0499	317.2
Faculty	2,079	523	0.3954	3.9751	206.8	464	0.3908	4.4806	181.4
Staff	9,309	799	1.1588	11.6508	925.9	693	1.1718	13.4329	812.0
Overall	39,562	3,935	1.0000	10.0539	3,935.0	3,451	1.0000	11.4639	3,451.0

Reference week

The main statistics we measure are based on questions asking respondents about their activity during each of the seven days of the week prior to receiving the invitation to complete the survey. The calendar week serving as the reference week varied depending on when the respondent chose to complete the survey. Following the initial invitation to complete the survey, distributed on November 6 (Thursday), the reference week specified in the survey instructions was October 27–November 2 (Monday–Sunday). Following the follow-up invitations distributed on November 10 and 12 (Monday and Wednesday), the reference week specified was November 3–9 (Monday–Sunday). Table 7 notes events occurring these days that may have affected respondents’ travel and other activities, including rain on the Friday of the first reference week, the Halloween holiday on the Friday of the first reference week, and the presidential election held on the Tuesday of the second reference week.

Table 7. Weather and other events occurring during survey reference week

Day	Temperature ranges, precipitation, and notable events ^a	
	Week 1: October 27-November 2	Week 2: November 3-9
Monday	43 – 84 °F	51 – 65 °F
Tuesday	42 – 83 °F	Wind (24 mph gusts) 46 – 63 °F
Wednesday	43 – 82 °F	Wind (34 mph gusts) Election day 37 – 59 °F
Thursday	52 – 79 °F	Some fog 44 – 68 °F
Friday	57 – 72 °F Rain later in the day (total 0.36") Halloween holiday Davis elementary schools have the day off	43 – 70 °F Some fog
Saturday	57 – 70 °F Rain (0.44") & wind (25 mph gusts)	45 – 68 °F
Sunday	55 – 66 °F Rain (1.44") & wind (21 mph gusts)	48 – 65 °F Wind (23 mph gusts)

^a Weather data are for Sacramento, as reported in the *Farmer’s Almanac*, available online by city and date at <http://www.almanac.com/weatherhistory>.

FINDINGS

This section summarizes some of the results from the survey. Throughout this section, data presented are weighted by role, as described above, and therefore the sample sizes reported are referred to as the “weighted sample.” Many statistics are presented by role group as defined above (freshmen, sophomores, juniors, seniors, master’s students, PhD students, faculty, and staff). In addition, some are also broken down by students (including freshmen through PhD student role-group categories), undergraduates (freshmen through senior role-group categories), graduate students (master’s and PhD student role-group categories), employees (faculty and staff role-group categories), within Davis (those living on campus or elsewhere in Davis among all role-group categories), and outside Davis (those living outside of Davis among all role-group categories).

Number traveling to campus

About 92 percent of the sample traveled to campus on the average weekday during their reference week (see Table 8), with a low of about 84 percent traveling to campus on Friday (Table 9). For any days not traveled, respondents were asked to indicate the reason (Table 8).

Table 8. Percent not traveling to campus on an average weekday and reason given

Role group	Not traveling	Among those not traveling, percent giving each reason							Weighted sample	Projected pop.
		Day off	Working from home	Traveling for work	Sick	Vacation	CWW ^a	Other ^b		
Freshmen	4.7%	43.2%	2.9%	17.3%	11.5%	5.8%	3.8%	15.3%	457	4,594
Sophomores	3.6%	58.8%	5.5%	13.7%	1.4%	1.4%	2.7%	16.4%	447	4,493
Juniors	7.9%	70.9%	1.2%	3.6%	3.0%	1.8%	4.2%	15.0%	577	5,791
Seniors	8.6%	49.3%	3.4%	8.1%	12.2%	2.7%	0.7%	23.6%	768	7,733
Masters	12.6%	62.0%	12.0%	8.2%	1.4%	1.0%	2.4%	13.0%	192	1,929
PhD	10.2%	28.0%	37.0%	9.6%	2.9%	2.9%	2.9%	16.6%	362	3,642
Faculty	19.3%	22.9%	27.9%	20.8%	0.4%	4.5%	10.5%	12.8%	207	2,078
Staff	13.6%	18.6%	15.5%	11.4%	11.8%	10.2%	6.5%	26.2%	925	9,300
Students	7.5%	51.8%	9.9%	8.8%	6.4%	2.6%	2.5%	17.9%	2,802	28,182
Undergraduate	6.6%	56.1%	2.9%	8.6%	8.1%	2.7%	2.4%	19.0%	2,249	22,611
Graduate	11.0%	41.5%	27.1%	9.0%	2.3%	2.1%	2.7%	15.2%	553	5,571
Employees	14.6%	19.7%	18.5%	13.7%	9.1%	8.8%	7.4%	23.0%	1,132	11,378
Outside Davis	18.4%	39.2%	17.2%	7.9%	5.5%	4.9%	4.7%	20.7%	909	9,144
Within Davis	6.9%	36.5%	10.9%	13.4%	9.2%	5.6%	4.7%	19.7%	3,025	30,416
Overall	9.6%	37.7%	13.7%	10.9%	7.6%	5.3%	4.7%	20.1%		
Weighted sample	376	142	51	41	28	20	18	76	3,934	
Projected pop.	3,782	1,425	518	414	287	201	177	762		39,562

Data are weighted by role based on the 3,935 valid responses to Q0008 (see Table 6). Results are based on responses to questions Q0008, Q0009, Q0013, and Q0023 through Q0027. For respondents who did not travel any days during the reference week (based on Q0008), the reason for not traveling given in Q0013 was assumed to apply to all five weekdays. For respondents not traveling only on certain days, the reason by day was measured in questions Q0023 through Q0027. We calculate the share of days among the five weekdays that each individual did not travel to campus for a given reason; the average of these is equivalent to the percent of people not traveling for a given reason on an average weekday.

^a Day off as part of a 3/36, 4/40, or 9/80 compressed work week.

^b Respondents selecting “Other (e.g. jury duty),” plus those who wrote in a description of an “other” reason that could not be otherwise categorized (in question Q0013 only), plus those not responding to the question.

Table 9. Number traveling to campus by day

Day	Number traveling (weighted sample)	Percent of sample	Population projection
Monday	3,604	91.6%	36,241
Tuesday	3,623	92.1%	36,440
Wednesday	3,641	92.6%	36,619
Thursday	3,634	92.4%	36,546
Friday	3,294	83.7%	33,127
Saturday	761	19.3%	7,655
Sunday	755	19.2%	7,593
No days	83	2.1%	836
Total	3,934	100.0%	39,562

Based on responses to Q0009. Data are weighted by role based on the 3,935 valid responses to Q0008 (see Table 6).

Mode split

For physical trips to campus, mode was determined by asking “What was your primary means of transportation from home to your first campus destination each of these days? If you used more than one means of transportation on a given day, indicate whichever one you used to travel the greatest amount of distance” (question Q0011). Thus the modes identified are those used for *most* of the trip, and only on the way *to* campus at the beginning of the day. For each respondent, we calculated percent of days out of the five-day week that a given mode was used. (For instance if someone biked one day, her bike share would be 20 percent.) The overall mode split reported in Table 10 represents the average shares across all respondents, which is equivalent to the percent of all people using each mode on an average weekday.

Because we consider working from home (telecommuting) to be a substitute for physical travel, it is included as a “mode” in our mode split percentages. Telecommuting data are based on responses to questions Q0013 and Q0023–Q0027. If working from home was indicated in Q0013 as the reason for not traveling, we assumed that the individual did so all five weekdays. We excluded all other reasons for not traveling from the mode split. Therefore for the mode split reported, the denominator is all people who physically traveled to campus plus those who worked from home on a given day.

As shown in Table 10, we find that on an average weekday, about 40 percent of people bike to campus (projected 14,592 people), 32 percent arrive by car (11,543 people), and 21 percent ride transit (7,513 people). The share biking is highest among freshmen and lowest among staff and those living outside Davis. Transit ridership (especially bus) is particularly high among undergraduates.

Table 11 shows the percent of people using each mode as their primary mode on the way to campus at least one day during the reference week. For instance, while we estimate that about 290 ride the train to campus on an average weekday (Table 10), we estimate that 795 ride the train at some point during the average week (Table 11). The denominator for the percentages shown in Table 11 is the entire campus population, including those who did not travel to campus.

Table 10: Primary weekday mode split (percent using each mode on an average weekday)

Role group	Percent traveling ^a	Among those traveling, percent:								Weighted sample	Projected pop.
		Bike	Walk	Skate	Drive alone	Carpool or get a ride	Bus	Train	Work from home		
Freshmen	95.4%	73.7%	12.0%	1.3%	2.1%	1.5%	8.6%	0.7%	0.1%	456	4,597
Sophomores	96.6%	42.7%	2.4%	0.3%	6.6%	4.8%	42.8%	0.3%	0.2%	446	4,498
Juniors	92.2%	38.1%	5.7%	0.6%	12.7%	4.5%	38.2%	0.2%	0.1%	575	5,796
Seniors	91.7%	36.6%	8.8%	0.2%	17.3%	6.4%	29.9%	0.4%	0.3%	768	7,721
Masters	88.9%	48.2%	4.7%	0.0%	30.6%	4.5%	8.3%	2.0%	1.7%	192	1,926
PhD	93.6%	52.4%	5.3%	0.2%	25.4%	5.1%	5.7%	1.9%	4.0%	362	3,636
Faculty	86.1%	37.5%	4.2%	0.0%	39.8%	6.9%	2.5%	2.7%	6.3%	206	2,079
Staff	88.5%	19.3%	1.6%	0.0%	53.9%	16.6%	5.4%	0.8%	2.4%	924	9,309
Students	93.2%	46.9%	6.9%	0.5%	14.0%	4.7%	25.6%	0.7%	0.8%	2,799	28,174
Undergraduate	93.5%	45.9%	7.4%	0.5%	10.8%	4.6%	30.2%	0.4%	0.2%	2,246	22,612
Graduate	92.0%	51.0%	5.1%	0.1%	27.2%	4.9%	6.6%	1.9%	3.3%	553	5,562
Employees	88.1%	22.6%	2.1%	0.0%	51.4%	14.9%	4.9%	1.1%	3.1%	1,130	11,388
Outside Davis	84.8%	2.6%	0.5%	0.1%	66.3%	17.5%	5.9%	3.4%	3.7%	908	8,831
Within Davis	93.8%	50.4%	7.0%	0.4%	12.9%	4.8%	23.7%	0.1%	0.8%	3,021	30,731
Overall	91.7%	40.2%	5.6%	0.3%	24.3%	7.5%	19.9%	0.8%	1.4%	3,929	
Projected pop.	36,298	14,585	2,027	123	8,826	2,715	7,218	286	518		36,592

Data are weighted by role based on the 3,935 valid responses to *Q0008* (see Table 6). Results are based on responses to questions *Q0011* (for physical means of transportation) and questions *Q0013* and *Q0023* through *Q0027* for those working from home. Percentages are calculated as the percent of five weekdays that an individual respondent used a particular mode; the average over all respondents represents the percent using this mode on an average weekday.

^a Includes all those physically traveling to campus as well as those working from home, which we treat as virtual travel, but excludes those not traveling to campus for any other reason (sick, day off, etc.).

Table 11. Percent using each mode as a primary mode at least once during the five-day week

Role group	Percent of people using each as their primary mode to campus at least once									Sample size	Projected pop.
	Bike	Walk	Skate	Drive alone	Carpool or get a ride	Bus	Train	Work from home	Other no travel		
Freshmen	80.1%	21.7%	2.0%	2.9%	4.3%	14.0%	2.0%	0.2%	9.9%	456	4,597
Sophomores	54.5%	5.2%	0.5%	11.2%	12.7%	57.0%	0.2%	0.2%	9.2%	446	4,498
Juniors	46.9%	11.5%	1.4%	18.9%	9.6%	49.3%	0.2%	0.2%	23.0%	575	5,796
Seniors	44.9%	12.8%	0.6%	26.1%	14.5%	42.6%	1.2%	0.9%	21.7%	768	7,721
Masters	52.6%	7.6%	0.0%	41.9%	9.1%	13.1%	2.7%	4.0%	31.3%	192	1,926
PhD	60.6%	10.0%	0.3%	34.6%	12.0%	10.3%	3.1%	9.8%	17.7%	362	3,636
Faculty	43.3%	6.3%	0.0%	49.6%	12.3%	4.6%	5.0%	15.7%	29.1%	206	2,079
Staff	22.5%	3.1%	0.0%	62.1%	22.1%	7.4%	1.0%	4.8%	27.2%	924	9,309
Students	55.1%	12.0%	0.9%	20.6%	10.8%	35.4%	1.3%	1.9%	18.2%	2,799	28,174
Undergraduate	54.5%	12.7%	1.1%	16.6%	10.8%	41.4%	0.9%	0.5%	17.2%	2,246	22,612
Graduate	57.8%	9.1%	0.2%	37.2%	11.0%	11.2%	3.0%	7.8%	22.4%	553	5,562
Employees	26.3%	3.7%	0.0%	59.8%	20.3%	6.9%	1.7%	6.8%	27.6%	1,130	11,388
Outside Davis	4.4%	0.8%	0.2%	73.7%	21.9%	7.4%	5.3%	7.4%	36.3%	908	8,831
Within Davis	59.6%	12.3%	0.8%	19.4%	11.0%	33.1%	0.3%	2.1%	16.3%	3,021	30,731
Overall	46.8%	9.6%	0.6%	31.9%	13.6%	27.2%	1.4%	3.3%	20.9%	3,929	
Weighted sample	1,840	379	25	1,254	533	1,069	57	130	821	3,929	
Projected pop.	18,530	3,814	254	12,627	5,365	10,762	571	1,304	8,266		39,562

Data are weighted by role based on the 3,935 valid responses to *Q0008* (see Table 6). Results are based on responses to questions *Q0011* (for physical means of transportation) and questions *Q0013* and *Q0023* through *Q0027* for those working from home.

In addition to questions about respondents’ travel during the particular reference week preceding the survey, we also asked respondents more detailed questions about their “typical travel between home and campus destinations, whether or not it’s what you did last week” (questions *Q0029–Q0048*). In this section, respondents reported if they typically used multiple modes on their way to campus and what modes they use on each segment of their trip. (Any walking longer than 7 minutes was counted as a separate mode.) Table 12 shows the percent of people who report using each mode for at least some portion of their typical travel to campus. For most modes, the percent of people identifying a given mode as part of their typical travel (Table 12) is roughly similar to the percent using each primary mode on the average weekday during the reference week (Table 10), with the exception of biking and walking, which presumably are the most likely modes to be paired with other modes as a part of a multimodal trip to campus. In total, about 11 percent of the sample reported that they typically use more than one mode (Table 13). About 50 percent of multimodal trips involve bikes and 58 percent involve transit (Table 14).

Table 12. Percent using each mode at some point during a “typical” commute to campus, by role

Role group	Bike	Walk	Skate	Drive alone	Carpool or ride	Bus or train	Weighted sample	Projected pop.
Freshmen	79.1%	13.9%	1.2%	2.7%	2.4%	9.2%	423	4,597
Sophomores	53.0%	3.9%	0.5%	5.5%	4.5%	43.0%	423	4,498
Juniors	45.7%	8.9%	1.5%	14.9%	4.0%	40.2%	554	5,796
Seniors	44.0%	14.7%	0.3%	18.7%	4.3%	31.5%	728	7,721
Masters	51.8%	10.2%	0.0%	35.5%	3.2%	11.8%	182	1,926
PhD	63.9%	7.9%	0.2%	27.1%	4.5%	9.5%	347	3,636
Faculty	44.0%	5.2%	0.0%	45.2%	9.6%	7.0%	198	2,079
Staff	24.4%	5.2%	0.0%	56.1%	18.7%	6.6%	874	9,309
Students	54.5%	10.5%	0.7%	15.5%	3.9%	27.4%	2,657	28,174
Undergraduate	53.2%	10.9%	0.8%	11.9%	3.9%	31.6%	2,129	22,612
Graduate	59.7%	8.7%	0.1%	30.0%	4.0%	10.3%	529	5,562
Employees	28.0%	5.2%	0.0%	54.1%	17.0%	6.7%	1,072	11,388
Outside Davis	11.8%	7.4%	0.2%	72.2%	19.9%	12.4%	865	8,831
Within Davis	57.5%	9.4%	0.6%	12.8%	4.0%	24.2%	2,865	30,731
Overall	46.9%	8.9%	0.5%	26.6%	7.7%	21.4%		
Weighted sample	1,749	333	18	992	286	799	3,730	
Projected pop.	18,552	3,535	195	10,518	3,035	8,480		39,562

Data are weighted by role based on the 3,935 valid responses to *Q0008* (see Table 6). Results are based on responses to questions *Q0031, Q0032, Q0034, Q0037, Q0040, Q0043, and Q0046*.

Table 13: Number of modes used during “typical” trip to campus

Role group	Percent typically using...			Weighted sample	Projected pop.
	1 mode	2 modes	3+ modes		
Freshmen	91.3%	7.8%	1.0%	424	4,597
Sophomores	89.5%	9.4%	1.0%	423	4,498
Juniors	85.6%	12.9%	1.5%	556	5,796
Seniors	86.2%	12.5%	1.2%	728	7,721
Masters	87.5%	10.2%	2.2%	182	1,926
PhD	88.4%	8.5%	3.1%	347	3,636
Faculty	90.1%	7.0%	3.0%	199	2,079
Staff	90.3%	7.4%	2.3%	874	9,309
Students	87.8%	10.7%	1.5%	2,660	28,174
Undergraduate	87.7%	11.1%	1.2%	2,131	22,612
Graduate	88.1%	9.1%	2.8%	529	5,562
Employees	90.3%	7.3%	2.4%	1,073	11,388
Outside Davis	78.7%	15.6%	5.6%	865	8,831
Within Davis	91.5%	7.9%	0.6%	2,868	30,731
Overall	88.5%	9.7%	1.8%	3,732	
Projected pop.	35,017	3,844	701		39,562

Data are weighted by role based on the 3,935 valid responses to Q0008 (see Table 6). Data are based on responses to questions Q0030, Q0036, Q0039, Q0042, Q0045, and Q0048.

Table 14: Modes typically used by single-mode versus multi-modal commuters

Mode	Percent using this mode for any part of trip			Weighted sample	Projected pop.
	Among single-mode users	Among multi-mode users	Overall		
Bike	46.6%	48.8%	46.9%	1,749	18,552
Walk	4.5%	43.5%	8.9%	333	3,535
Drive alone	24.8%	40.4%	26.6%	18	195
Carpool	6.8%	14.2%	7.7%	992	10,518
Any transit (bus or train)	16.9%	56.3%	21.4%	799	8,480
Overall	88.6%	11.4%	100.0%		
Weighted sample	3,303	426	3,730	3,730	
Projected population	35,039	4,523	39,562		39,562

Data are weighted by role based on the 3,935 valid responses to Q0008 (see Table 6). The number of modes used (categorization of “single-mode” versus “multi-mode” commuter is based on responses to question Q0030. Whether a mode was used for any portion of the trip is based on responses to questions Q0031, Q0032, Q0034, Q0037, Q0040, Q0043, and Q0046.

Table 15 compares results on the percent of the population using bikes during the reference week versus during their reported typical commute, potentially in combination with other modes. Based on the reported primary mode during the reference week, about 49 percent of respondents used a bike at least one of the days as their primary mode of transportation, with an average of 37 percent using a bike on any given day. The percent of respondents who report that they “typically” use a bike as their sole means of transportation between home and campus is between these two figures at 41 percent (a projected 16,334 individuals), with an additional 6 percent (a projected 2,207 individuals) reporting that they typically use a bike in combination with other modes. These reports of typical use would bring an estimated 18,541 bikes to campus on a daily basis. There may be an additional number of bikes brought to campus as part of an atypical pattern (that is, people that only occasionally use a bike, either alone or in combination with other modes).

Table 15. Estimated number of bikers, from various survey questions

Role group	Single (primary) mode reported during reference week ^a		All mode(s) reported as part of typical trip to campus ^b		Projected population
	Percent biking on average weekday	Percent biking at least once during week	Percent biking as sole mode	Percent biking combined with other mode(s)	
Freshmen	70.3%	80.1%	71.8%	7.1%	420
Sophomores	41.2%	54.5%	45.7%	7.3%	395
Juniors	35.1%	46.9%	39.1%	6.5%	506
Seniors	33.6%	44.9%	39.1%	4.9%	674
Masters	42.9%	52.6%	47.3%	4.5%	168
PhD	49.0%	60.6%	56.6%	7.3%	318
Faculty	32.3%	43.3%	38.4%	5.6%	182
Staff	17.1%	22.5%	20.8%	3.6%	812
Students	43.7%	57.7%	48.2%	6.2%	2,479
Undergraduate	43.0%	57.5%	46.9%	6.2%	1,994
Graduate	46.9%	58.0%	53.4%	6.3%	486
Employees	19.9%	30.7%	24.1%	3.9%	994
Outside Davis	2.2%	4.4%	2.1%	9.7%	770
Within Davis	47.3%	62.8%	53.1%	4.3%	2,703
Overall	36.9%	48.6%	41.3%	5.6%	
Weighted sample	1,448	1,911	1,541	208	3,473
Projected population	14,585	19,242	16,334	2,207	39,562

Data are weighted by role based on the 3,935 valid responses to Q0008 (see Table 6).

Vehicle occupancy and ridesharing

Among those traveling to campus (or working from home) on an average weekday, we estimate about 32 percent arrive by private vehicle (either driving alone, carpooling, or getting a ride) (see Table 10 and Table 16). Among these, about 76 percent drive alone, 18 percent carpool, and 5 percent get a ride with someone who drops them off (Table 16). Among vehicle-users, freshmen and sophomores are least likely to drive alone (58 percent, in both classes) relative to the other role groups, whereas graduate students and faculty are most likely to drive alone (85 percent, in both groups). Freshmen and sophomores are more likely to carpool (22 percent and 27 percent, respectively) and to get rides (19 percent and 15 percent, respectively) relative to the other role groups.

Both those arriving in carpools (multiple people in the vehicle arriving on campus together) and those getting a ride to campus (where the driver continues on to another destination after the drop-off) were asked how many other people were in the vehicle. The percent of vehicle users arriving in 2- and 3-plus-person carpools and of those getting a ride as the sole passenger or multiple passengers dropped off is shown in Table 16. The average vehicle occupancy for carpools and rides is shown in Table 17. Among those who carpooled at any point during the reference week, the average number of passengers was 2.59 (including the driver), with a high of 3.42 among freshmen and a low of 2.30 among staff. Most people dropped off on campus were the sole passenger dropped, with an average of 1.33 passengers dropped off per ride to campus (excluding the driver) (see Table 17).

Table 16: Percent driving alone versus ridesharing on an average weekday

Role group	Percent "traveling" ^a	Among those traveling, percent:						Weighted sample	Projected pop.
		Arriving by private vehicle ^b	Among those in vehicles, percent:						
			Driving alone	Carpool of 2	Carpool of 3+	Ride: 1 dropped	Ride: 2+ dropped		
Freshmen	95.4%	3.6%	58.4%	13.0%	9.1%	9.1%	10.4%	456	4,597
Sophomores	96.6%	11.4%	57.7%	18.5%	9.0%	9.9%	5.0%	446	4,498
Juniors	92.2%	17.2%	74.0%	17.8%	3.3%	4.2%	0.6%	575	5,796
Seniors	91.7%	23.8%	72.9%	13.6%	2.9%	9.0%	1.6%	768	7,721
Masters	88.9%	35.2%	87.2%	7.2%	2.1%	3.5%	0.0%	192	1,926
PhD	93.6%	30.5%	83.4%	9.8%	1.6%	4.8%	0.5%	362	3,636
Faculty	86.1%	46.8%	85.2%	11.3%	1.3%	2.0%	0.2%	206	2,079
Staff	88.5%	70.5%	76.4%	16.9%	3.5%	3.1%	0.1%	924	9,309
Students	93.2%	18.7%	75.1%	13.3%	3.4%	6.6%	1.6%	2,799	28,174
Undergraduate	93.5%	15.4%	70.2%	15.5%	4.3%	7.8%	2.3%	2,246	22,612
Graduate	92.0%	32.1%	84.7%	8.8%	1.8%	4.3%	0.3%	553	5,562
Employees	88.1%	66.2%	77.5%	16.2%	3.2%	3.0%	0.1%	1,130	11,388
Outside Davis	84.8%	83.8%	79.1%	15.3%	3.5%	1.8%	0.3%	908	8,831
Within Davis	93.8%	17.7%	73.1%	14.4%	3.1%	8.1%	1.4%	3,021	30,731
Overall	91.7%	31.8%	76.5%	14.9%	3.3%	4.5%	0.8%		
Weighted sample	3,605	1,146	876	171	38	52	9	3,929	
Projected pop.	36,298	11,540	8,826	1,722	380	525	88		39,562

Data are weighted by role based on the 3,935 valid responses to Q0008 (see Table 6). Mode of transportation (drive alone, carpool, or ride) is based on responses question Q0011. Vehicle occupancy is based on responses to question Q0016 for carpools and Q0017 for those getting a ride. Responses for Q0016 and Q0017 were assumed to apply to all days that a respondent carpooled or got a ride during the reference week, as indicated in Q0011. For each respondent, we calculated the percent of days out of the five-day week that a given mode/occupancy-level was used; the average shares across all respondents is equivalent to the percent of people using each mode/occupancy-level on an average weekday.

^a Includes those physically traveling to campus by any means of transportation plus those working from home (as in Table 10), but excluding those not traveling to campus for any other reason.

^b Including driving alone, carpools, or getting a ride, as indicated in question Q0011.

Table 17: Average carpool size

Role group	Average occupancy among those that carpooled /rode at least once		Weighted sample	
	Carpool occupants (including driver)	Ride passengers (excluding driver)	Carpool	Ride
Freshmen	3.42	1.73	37	66
Sophomores	2.70	1.50	88	73
Juniors	2.46	1.20	105	62
Seniors	2.98	1.23	118	105
Masters	2.35	1.11	25	11
PhD	2.30	1.22	44	35
Faculty	2.78	1.04	25	10
Staff	2.30	1.09	192	51
Students	2.72	1.37	416	352
Undergraduate	2.80	1.40	347	306
Graduate	2.32	1.19	69	46
Employees	2.36	1.08	218	61
Outside Davis	2.57	1.17	205	40
Within Davis	2.61	1.35	428	372
Overall	2.59	1.33	634	413

Data are weighted by role based on the 3,935 valid responses to Q0008 (see Table 6). Vehicle occupancy is based on responses to question Q0016 for those carpools/vanpools and to question Q0017 for those who got a ride.

Number of vehicles arriving on campus

The results on the number of people driving alone, carpooling, getting a ride, and the number of people per vehicle can be combined to estimate the total number of vehicles arriving on campus. In particular, we estimate the count of private vehicle arrivals as the number of people driving alone, plus fractional vehicles counted in proportion to vehicle occupancy. That is, if a respondent reports arriving in a three-person carpool, we count this as 0.33 vehicles arriving on campus on behalf of that respondent. We weight and expand the sample to project the total number of vehicle arrivals for the entire campus population, using the weighting factors shown in Table 6. We estimate that 10,313 vehicles come to campus on an average weekday, or about one vehicle for every 3.52 person traveling to campus (Table 18). About 970 of these contain carpools and 552 are vehicles just dropping passenger(s) off.

Table 18. Projected number of vehicles arriving on an average weekday, by role

Role group	Projected number of vehicle arrivals on an average weekday				Total population (people)	Estimated percent of people traveling ^a on average weekday	Ratio total people/vehicles	Ratio traveling ^a people/vehicles
	Drive alone	Carpool	Ride	Total vehicles				
Freshmen	93	15	23	131	4,597	95.4%	35.13	33.52
Sophomores	286	59	60	405	4,498	96.6%	11.10	10.72
Juniors	678	92	41	811	5,796	92.2%	7.15	6.59
Seniors	1,226	128	157	1,511	7,721	91.7%	5.11	4.69
Masters	525	26	21	571	1,926	88.9%	3.37	3.00
PhD	866	56	50	971	3,636	93.6%	3.74	3.50
Faculty	712	50	17	778	2,079	86.1%	2.67	2.30
Staff	4,406	545	183	5,134	9,309	88.5%	1.81	1.61
Students	3,673	375	352	4,401	28,174	93.2%	6.40	5.97
Undergraduate	2,283	294	281	2,858	22,612	93.5%	7.91	7.40
Graduate	1,390	81	71	1,543	5,562	92.0%	3.61	3.32
Employees	5,118	595	200	5,912	11,388	88.1%	1.93	1.70
Outside Davis	5,132	558	125	5,816	8,831	84.8%	1.52	1.29
Within Davis	3,659	412	427	4,497	30,731	93.8%	6.83	6.41
Overall	8,791	970	552	10,313	39,562	91.7%	3.84	3.52

Data are weighted (and expanded) by role based on the 3,935 valid responses to Q0008 (see Table 6). Results are based on responses to question Q0011 (for mode used: drive alone, carpool, or getting a ride), questions Q0013 and Q0023 through Q0027 (for days not traveling and working from home), and questions Q0016 and Q0017 (for vehicle occupancy).

^a Includes those physically traveling to campus by any means plus those working from home.

Average Vehicle Ridership

Another way of calculating the ratio of person-arrivals to private-vehicle-arrivals is the average vehicle ridership (AVR), as calculated by the South Coast Air Quality Management District, computed here for comparison with figures from other UC campuses (see Appendix D for details on the calculation of AVR). The main difference between the ratios in Table 18 and the AVR figures reported in Table 19 is that in calculating AVR is the numerator (person-arrivals). Table 18 counts those working from home as virtual travelers for all role groups, while Table 19 does not include students working from home (potentially making student AVR lower than it otherwise might); Table 19 additionally counts as person-arrivals any employees taking days off as a part of a compressed work week schedule (potentially making employee AVR higher than it otherwise would be). In general, a way to interpret AVR is that if everyone drove by themselves to campus, the campus AVR would be one, and so higher values (greater than 1.0) indicate more carpooling and/or use of alternative modes of transportation.

Among those traveling from off campus, campus-wide AVR is estimated to be 2.99, up slightly from 2.75 in 2007-08. This means that for every car arriving on campus, there are about three people arriving on campus (using some means of transportation or another).

Table 19: Average Vehicle Ridership (AVR), 2008-09 and 2007-08

Role group	Off-campus only			All (on and off-campus)	
	2007-08, as in Congleton (2009)	2007-08, new calculation	2008-09 calculation	2007-08, new calculation	2008-09 calculation
Freshmen	4.53	5.32	5.35	26.39	33.40
Sophomores	7.89	6.46	10.24	6.78	10.67
Juniors	5.09	4.05	6.26	4.46	6.56
Seniors	4.39	3.55	4.39	3.77	4.67
Masters	5.31	3.22	2.71	3.49	2.94
PhD	4.33	3.55	2.86	4.20	3.36
Faculty	2.57	2.23	2.34	2.23	2.35
Staff	1.66	1.58	1.60	1.58	1.62
Student		1.67	4.76	5.04	5.91
Undergraduate	5.31	4.24	5.80	5.04	7.37
Graduate	4.66	3.43	2.81	3.94	3.21
Employees	1.82	1.67	1.69	1.67	1.71
Outside Davis		1.33	1.32	1.33	1.33
Within Davis		4.60	5.17	5.61	6.32
Overall	4.17	2.75	2.99	3.20	3.51

For 2008-09 figures, data are weighted by role based on the 3,935 valid responses to question Q0008 (see Table 6). See Appendix D for details on AVR calculation.

Comparison of 2008-09 and 2007-08 mode splits

Mode-choice results across the two last survey years are not directly comparable because of differences in question and answer-choice wording offered to participants in each survey year (see Appendix B). One important difference across years is that 08-09 respondents were asked to indicate a single mode that they used for most of the trip, whereas 07-08 participants were given the option to indicate that they used more than one mode. In addition, 08-09 participants were not given an “other” category option, whereas the 07-08 participants could indicate “other.” At the same time, 08-09 respondents were offered the additional categories of train/rail, getting a ride, and skating, whereas 07-08 respondents were not explicitly offered these.

For the purposes of comparing the two years, we recoded 527 descriptions of multimodal trips from the 07-08 data into one of the other mode groups (reducing the number of travel days coded as multimodal from 1141 to 441, or about 60 respondents per travel day). We combined the remaining “multimodal” and “other” responses from 07-08 that could not otherwise be re-categorized into a single group. In addition, we grouped the “skate” responses in the 08-09 data in with walking, and getting a ride in with carpooling or driving alone (as described above). Finally, in combining the data collected for all five travel days into a single mode-split percentage for each mode, we apply the same method used for the 2008-09 data (described above) to the 2007-08 data, calculating the average percent of days that individuals use a given mode over the course of five days, equivalent to the average percent of individuals using a given mode on an average weekday. (This differs from the methodology used to calculate mode split in Congleton (2009), which defines primary mode as the one used most often out of the five days, favoring the “lower-impact” mode whenever ties occur.) Thusly, roughly comparable versions of overall mode split across years is shown in Table 20.

Table 20. Primary weekday mode split, 2008-09 and 2007-08

Year	Bike	Drive alone	Carpool	Bus	Walk	Train	Other/ multimodal	Telecommute	Weighted sample
2008-09	40.2%	24.3%	7.5%	19.9%	5.6%	0.8%	n/a	1.4%	3,605
2007-08	37.5%	28.8%	5.5%	19.0%	4.9%	n/a	3.7%	0.7%	3,917

Percentages shown are from among those who traveled to campus during the reference week (and therefore excluding 6.3% and 8.3% of the 07-08 and 08-09 samples, respectively). As in Table 10, percentages represent the average share of days (in five-day week) that each mode is used as the primary mode on a given day for each respondent. Data are weighted by role so that the proportion in each role group in the sample matches the proportion in the campus population in each year. (For 2008-09 data, the results are weighted based on the 3,935 valid responses to question Q0008, as shown in Table 6. For 2007-08 data, the results are weighted as shown in Table 51).

Table 21 shows the year-over-year percent change in the number using each mode, including the results of χ^2 tests for significant differences across years (indicated by asterisks).⁴ Statistically significant changes include an increase in biking, an increase in working from home, and a decrease in driving alone. Employees and staff show an increase in carpooling. Changes in other modes are not statistically significant across survey years.

Table 21. Percent change in primary weekday mode split, 2007-08 to 2008-09, by mode and role

Role group	Bike	Drive alone	Carpool	Bus	Walk	Work from home
Freshmen	-0.4%	-0.8%	-0.2%	0.7%	2.6%	n/a
Sophomores	10.2%	-5.2%	-0.4%	-1.4%	-0.7%	n/a
Juniors	4.5%	-7.3%	0.0%	5.3%	-0.5%	n/a
Seniors	4.6%	-4.2%	-1.6%	1.5%	3.0%	n/a
Masters	-3.0%	4.6%	1.0%	0.8%	-1.5%	n/a
PhD	-4.9%	4.9%	-0.3%	-1.4%	-0.5%	n/a
Faculty	0.6%	-1.8%	-0.3%	0.8%	1.0%	0.2%
Staff	-0.5%	-3.3%	4.5%	1.1%	-0.5%	0.9%
Students	3.7%	-2.7%	-0.6%	0.7%	0.9%	n/a
Undergraduate	5.4%	-4.7%	-0.7%	1.5%	1.4%	n/a
Graduate	-4.4%	4.7%	0.2%	-0.6%	-0.8%	n/a
Employees	-0.4%	-2.9%	3.5%	1.0%	-0.1%	0.8%
Outside Davis	-0.4%	-2.9%	4.0%	-0.9%	0.1%	2.0%
Within Davis	2.6%	-1.9%	-0.2%	1.0%	0.7%	0.5%
Overall	2.7%	-3.0%	0.5%	0.9%	0.7%	0.8%

Statistically significant difference with $p < 0.1$ in a two-category χ^2 test of the frequency of those using this mode versus those using any other mode in 2007-08 versus 2008-09.
Statistically significant at $p < 0.05$.

Time arriving on campus

Table 22 and Table 23 show the percent of respondents traveling to campus on a given day by role and whether they arrived during the morning peak, considered for the purposes of this survey to be between the hours of 6am and 10am. Among those traveling to campus on an average weekday, about three-quarters arrive during the peak period, or a projected 26,855 people.

⁴ In particular, we conducted χ^2 tests for the independence of the number of respondents falling into each mode group (as a binary categorical variable for each mode, for instance, “bike” versus “all other”) by survey year (2007-08 versus 2008-09). $p < 0.05$ indicates 95% confidence in rejecting the hypothesis of independence across groups.

Table 22. Arrivals during the peak period, by day

Day	Did not travel to campus	Arrivals between 6am – 10am, among those traveling to campus		Total	
		Percent	Projected number	Weighted sample	Projected population
Monday	8.4%	76.7%	27,791	3,929	39,562
Tuesday	7.9%	73.0%	26,602	3,929	39,562
Wednesday	7.5%	77.3%	28,305	3,929	39,562
Thursday	7.7%	73.3%	26,772	3,930	39,562
Friday	16.4%	75.0%	24,811	3,930	39,562
Saturday	80.8%	27.8%	2,114	3,930	39,562
Sunday	80.9%	22.5%	1,699	3,932	39,562

Data are weighted (and expanded) by role based on the 3,935 valid responses to *Q0008* (see Table 6). Results are based on responses to question *Q0012*.

Table 23. Percent arriving during the peak period on an average weekday, by role

Role	Did not travel to campus	Arrivals between 6am – 10am, among those traveling to campus	Total	
			Weighted sample	Projected population
Freshmen	4.7%	61.7%	456	4,597
Sophomores	3.6%	66.1%	446	4,498
Juniors	7.9%	69.0%	575	5,796
Seniors	8.6%	69.7%	768	7,721
Masters	12.6%	78.2%	192	1,926
PhD	10.2%	77.1%	362	3,636
Faculty	19.3%	86.9%	206	2,079
Staff	13.6%	92.0%	924	9,309
Overall	9.6%	75.1%		
Weighted sample	376	2,667	3,929	
Projected population	3,782	26,855		39,562

Data are weighted by role based on the 3,935 valid responses to *Q0008* (see Table 6). Results are based on responses to question *Q0012*.

Vehicle parking, on and off campus

Question *Q0018* asked “Where did you (or whoever drove you) park?” among any respondents who indicated having driven, carpoled, or gotten a ride to campus during the five-day reference week (question *Q0011*). Among those who answered this question (95.4 percent of the total arriving by vehicle, excluding the “unknown” column below), about 85 percent arrived in vehicles that parked on campus, an estimated 9,863 persons on an average weekday. About 9 percent reported parking off campus, or about 1,049 persons on an average weekday. (Note that the number of vehicles in each case may be fewer, to the extent that there is more than one person per vehicle). Students, especially undergraduates, were more likely to report parking off campus than were employees. Freshmen were particularly likely to report being dropped off.

Table 24: Percent arriving in vehicles that parked on and off campus, on an average weekday

Role group	On an average weekday					Weighted sample	Projected pop.
	Percent of people arriving by vehicle ^a	Among those arriving by vehicle ^a , percent of people parking:					
		On campus	Off campus	Dropped off	Unknown ^b		
Freshmen	3.5%	72.6%	3.9%	20.8%	2.6%	456	4,597
Sophomores	11.0%	73.2%	11.3%	9.5%	5.9%	446	4,498
Juniors	15.8%	79.9%	14.2%	3.3%	2.4%	575	5,796
Seniors	21.8%	73.9%	10.6%	8.2%	7.2%	768	7,721
Masters	31.2%	87.4%	5.4%	3.9%	3.3%	192	1,926
PhD	28.6%	80.4%	11.2%	6.3%	2.0%	362	3,636
Faculty	40.3%	91.0%	4.0%	1.5%	3.1%	206	2,079
Staff	62.4%	83.3%	7.7%	4.1%	4.9%	924	9,309
Students	17.4%	77.9%	10.6%	6.9%	4.4%	2,799	28,174
Undergraduate	14.4%	75.4%	11.4%	7.7%	5.4%	2,246	22,612
Graduate	29.5%	83.0%	9.1%	5.4%	2.5%	553	5,562
Employees	58.3%	84.3%	7.2%	3.7%	4.7%	1,130	11,388
Outside Davis	71.0%	83.3%	9.8%	2.5%	4.3%	908	8,831
Within Davis	16.6%	79.4%	7.2%	8.4%	4.9%	3,021	30,731
Overall	29.2%	81.6%	8.7%	5.1%	4.6%	3,929	39,562
Weighted sample	1,146	935	99	58	52	3,929	
Projected pop.	11,540	9,412	1,001	588	528		39,562
Overall percent of vehicles ^c		81.7%	9.0%	4.8%	4.4%		
Projected number of vehicles ^c	10,313	8,429	932	494	459		

Data are weighted by role based on the 3,935 valid responses to question *Q0008* (see Table 6). Results are based on responses to question *Q0018*. In particular, the parking location indicated in question *Q0018* is assumed to be true for all days that the respondent drove, carpooled, or got a ride in question *Q0011*. As with mode split, we calculated the share of the five days that each respondent parked, and then the average of this over all respondents is equivalent to the share of all respondents parking on an average weekday.

^a Including all those who reported driving alone, carpooling, or getting a ride in question *Q0011*.

^b Respondent indicated using a vehicle in *Q0011* but did not respond to question *Q0018*.

^c Number of vehicles counted as one vehicle for each person driving alone plus partial vehicles proportionate to the number of occupants in vehicles with more than one person (as in Table 18).

Number of riders by transit agency provider

Table 14 details which transit agencies respondents report using as a part of their typical commute. The overwhelming majority of transit-users ride Unitrans (86 percent), corresponding to a projected 7,309 daily riders. The results indicate that the next most utilized services include Amtrak (506 riders), Yolobus (301 riders), and the UCD/UCDMC shuttle (207 riders).

Table 25: Use of specific transit providers at some point during “typical commute”

Mode used for at least one leg of the journey to campus	Percent of total	Among transit riders				Weighted sample	Projected pop.
		Overall	Undergrads	Grad students	Employees		
Unitrans bus	18.5%	86.4%	93.8%	55.6%	40.4%	691	7,330
Amtrak train	1.3%	6.0%	2.1%	28.4%	25.1%	48	507
YOLOBUS	0.8%	3.6%	2.6%	5.1%	11.3%	28	301
UCD/UCDMC Shuttle	0.5%	2.4%	0.4%	11.0%	15.1%	20	207
Sacramento Regional Transit	0.2%	1.1%	1.0%	2.0%	1.1%	9	93
BART	0.2%	1.0%	0.5%	4.9%	2.7%	8	87
Fairfield Suisun Transit bus	0.2%	0.7%	0.3%	0.0%	4.8%	6	60
Amtrak motorcoach (bus)	0.1%	0.6%	0.2%	3.1%	2.7%	5	49
Davis Community Transit	0.0%	0.2%	0.2%	0.0%	0.6%	2	16
UC Berkeley - UC Davis shuttle	0.0%	0.0%	0.0%	0.0%	0.0%	0	0
Other public transportation	0.2%	0.8%	0.5%	2.1%	2.2%	6	65
Overall	21.4%	100.0%	100.0%	100.0%	100.0%	799	8,480
Weighted sample	3,730	799	2,129	529	1,072	3,730	
Projected population	39,562	8,480	7,153	571	762		39,562

Data are weighted by role based on the 3,935 valid responses to Q0008 (see Table 6). Data are based on responses to questions Q0031, Q0032, Q0034, Q0037, Q0040, Q0043, and Q0046 regarding “typical” travel to campus.

Self-reported travel time

Question Q0029 asked respondents to indicate how many minutes it usually takes them to get from home to their first campus destination (in categories of five-minute intervals up to an hour, then 1-2 hours, or 2 hours or more). Taking the midpoints of each category as the travel time, the average number of minutes respondents report spending on their trip from home to campus ranges from 12 minutes among freshmen to 25 minutes among faculty (Table 26). About 10 percent estimate spending more than a half hour, or about 20 percent of employees.

Residential location and distance from campus

The survey provided two ways of measuring respondents’ residential locations. The first was asking them whether they lived on campus, elsewhere in Davis, or outside Davis (question Q0008), as shown in Table 27. The results suggest that a projected 5,860 live on campus, 24,640 live elsewhere in Davis, and 8,721—predominantly employees—live outside Davis.

The survey also requested that respondents give their zip codes and an intersection near their homes. These were geocoded, when possible, and used to estimate respondents’ distance from campus (see Appendix E). Table 28 summarizes these estimated distances by role group. We discarded several data points greater than 175 miles that seemed implausible. Among the remaining cases, the average distance from campus is estimated to be 6.6 miles overall, though 23.3 miles among those outside of Davis. About 9 percent of the overall population and 17 percent of employees travel more than 20 miles. A full 70 percent travel fewer than 3 miles (Table 28). Note that because different methodologies were used to collect respondents’ residential address and to geocode and analyze network distances in 2008-09 versus 2007-08, distance estimates from this year’s data are not comparable to 2007-08.

Table 26: Reported number of minutes spent traveling to campus, by role

Role group	Average minutes ^a	Percent reporting...				Weighted sample	Projected population
		Less than 10 minutes	10-29 minutes	30-59 minutes	1 hour or more		
Freshmen	12.1	55.6%	39.8%	2.4%	2.2%	424	4,597
Sophomores	16.0	16.5%	77.7%	4.7%	1.0%	423	4,498
Juniors	17.5	21.0%	68.3%	8.7%	2.0%	556	5,796
Seniors	17.8	25.1%	63.9%	8.0%	3.1%	728	7,721
Masters	20.8	16.9%	68.1%	9.6%	5.4%	182	1,926
PhD	20.5	20.6%	64.8%	9.1%	5.4%	347	3,636
Faculty	25.1	15.9%	64.2%	9.7%	10.1%	199	2,079
Staff	24.4	8.6%	67.1%	21.1%	3.2%	874	9,309
Students	17.1	26.6%	63.6%	7.0%	2.8%	2,660	28,174
Undergraduate	16.2	28.4%	63.0%	6.4%	2.2%	2,131	22,612
Graduate	20.6	19.3%	65.9%	9.3%	5.4%	529	5,562
Employees	24.5	10.0%	66.6%	19.0%	4.5%	1,073	11,388
Outside Davis	37.1	1.1%	50.3%	35.6%	13.0%	865	8,831
Within Davis	13.8	28.1%	68.7%	2.8%	0.4%	2,868	30,731
Overall	19.2	21.8%	64.4%	10.4%	3.3%	3,732	
Projected population		8,634	25,493	4,124	1,311		39,562

Data are weighted by role based on the 3,935 valid responses to Q0008 (see Table 6). Results are based on responses to question Q0029.

^a Based on responses to question Q0029, which was categorical, by assuming that the travel time for each individual is the midpoint of the category reported or for the highest category, “2 hours or more,” that travel time is 2 hours (120 minutes).

Table 27: Residential location

Role group	On campus	Elsewhere in Davis	Outside of Davis	Multiple locations	Weighted sample	Projected population
Freshmen	87.3%	9.7%	3.0%	0.0%	480	4,597
Sophomores	4.6%	91.0%	4.1%	0.2%	456	4,498
Juniors	4.1%	85.3%	9.4%	1.2%	597	5,796
Seniors	6.2%	79.0%	13.2%	1.7%	795	7,721
Masters	9.3%	69.9%	19.0%	1.8%	193	1,926
PhD	15.1%	65.3%	18.6%	1.0%	370	3,636
Faculty	0.2%	66.7%	32.2%	0.9%	216	2,079
Staff	1.2%	42.8%	55.5%	0.5%	944	9,309
Students	20.3%	68.3%	10.4%	1.0%	2,891	28,174
Undergraduate	22.1%	68.7%	8.3%	0.9%	2,328	22,612
Graduate	13.1%	66.8%	18.7%	1.3%	563	5,562
Employees	1.0%	47.3%	51.1%	0.6%	1,161	11,388
Overall	14.8%	62.3%	22.0%	0.9%		
Weighted sample	600	2,524	893	35	4,052	
Projected population	5,857	24,640	8,721	344		39,562
Overall 2007-08 ^a	14.7%	61.0%	24.3%	n/a		40,601

Data are weighted by role based on the 3,935 valid responses to Q0008 (see Table 6). Results are based on responses to question Q0008.

^a Based on geocoded residential location in the 2007-08 survey, as reported in Congleton (2009, Table 3-3, p. 11).

Table 28. Distance from campus, by role

Role group	Percent			Maximum distance (miles)	Average distance (miles)	Weighted sample
	Less than 3 miles	3 to 20 miles	More than 20 miles			
Freshmen	97.1%	2.3%	0.7%	27.7	1.1	420
Sophomores	90.9%	7.0%	2.1%	89.2	2.8	395
Juniors	83.3%	10.5%	6.2%	75.4	4.4	506
Seniors	78.4%	15.1%	6.5%	89.0	4.8	674
Masters	70.0%	21.6%	8.4%	83.1	7.3	168
PhD	69.3%	21.3%	9.5%	174.7	8.1	318
Faculty	47.5%	36.8%	15.7%	85.4	12.0	182
Staff	33.5%	49.1%	17.5%	72.7	12.1	812
Students	82.8%	11.9%	5.3%	174.7	4.4	2,479
Undergraduate	86.0%	9.6%	4.3%	89.2	3.6	1,994
Graduate	69.5%	21.4%	9.1%	174.7	7.8	486
Employees	36.0%	46.8%	17.1%	85.4	12.0	994
Outside Davis	2.5%	58.4%	39.1%	174.7	23.3	770
Within Davis	88.5%	11.5%	0.0%	9.9	1.8	2,703
Overall	69.4%	21.9%	8.7%	174.7	6.6	
Weighted sample	2,411	761	301			3,473
Projected population	27,465	8,670	3,427			

Data weighted by role for 3,451 cases successfully geocoded by zip code and cross streets (given in *Q0050* and *Q0051* or *Q0087* and *Q0088*, or dorm name given in *Q0005*) and with non-missing mode choice data in question *Q0011* (see Table 6). The methodology used for calculating network distance is described in Appendix E.

Table 29 and Table 30 show the correspondence between distance and mode choice. In particular, Table 29 shows the percent who live various distances from campus, among those who use each mode, while Table 30 shows the percent using each mode, among those who live various distances from campus. For instance, we see that among those who biked at least once during the reference week, 92 percent live within three miles of campus; Meanwhile, among those who live three miles from campus, 51 percent bike to campus on average weekday. We also see that the average distance from campus is greatest among those taking the train (41 miles) and working from home (21 miles).

Table 29. Distance from campus, by mode used

Mode	Among those using this mode at least one weekday			Maximum distance (miles)	Average distance (miles)	Weighted sample
	Percent who live					
	Less than 3 miles	3 to 20 miles	More than 20 miles			
Bike	91.7%	8.1%	0.3%	75.8	1.8	1,667
Walk	97.4%	2.1%	0.5%	79.7	1.4	344
Skate	89.8%	0.0%	10.2%	21.0	3.3	23
Drive alone (SOV)	38.1%	43.3%	18.6%	174.7	12.3	1,192
Carpool/ride (HOV)	42.5%	43.8%	13.7%	87.8	11.2	332
Bus	83.3%	14.7%	2.0%	39.2	3.1	941
Train	17.2%	11.2%	71.6%	93.0	40.5	50
Work from home	38.9%	29.9%	31.2%	111.2	20.7	112
Other did not travel	54.0%	27.5%	18.5%	174.7	11.8	689
Overall	69.4%	21.9%	8.7%	174.7	6.6	3,473
Weighted sample	2,411	761	301			
Projected population	27,465	8,670	3,427			

Data weighted by role for 3,451 cases successfully geocoded by zip code and cross streets (given in *Q0050* and *Q0051* or *Q0087* and *Q0088*, or dorm name given in *Q0005*) and with non-missing mode choice data in question *Q0011* (see Table 6). The methodology used for calculating network distance is described in Appendix E.

Table 30. Mode used, by distance from campus

Mode	Percent using each mode on an average weekday			
	Among those living:			Overall
	Less than 3 miles	3 to 20 miles	More than 20 miles	
Bike	51.4%	11.2%	0.5%	38.1%
Walk	7.5%	0.3%	0.2%	5.2%
Skate	0.4%	0.0%	0.3%	0.3%
Drive alone (SOV)	10.6%	51.4%	54.0%	23.3%
Carpool/ride (HOV)	2.4%	12.6%	10.7%	5.3%
Bus	21.4%	13.0%	4.4%	18.1%
Train	0.1%	0.3%	7.0%	0.8%
Work from home	0.7%	1.6%	4.7%	1.2%
Other did not travel	5.6%	9.7%	18.2%	7.6%
Overall	100.0%	100.0%	100.0%	100.0%
Weighted sample	2,389	761	301	3,451
Projected population	27,465	8,670	3,427	39,562

Data weighted by role for 3,451 cases successfully geocoded by zip code and cross streets (given in *Q0050* and *Q0051* or *Q0087* and *Q0088*, or dorm name given in *Q0005*) and with non-missing mode choice data in question *Q0011* (see Table 6). The methodology used for calculating network distance is described in Appendix E.

Aggregate person-miles and vehicle-miles traveled

We estimate the number of miles traveled based on the shortest-distance path along the road network between a respondent's reported home location and campus—assuming that respondents take this shortest path to and from campus on the days they report having traveled to campus. This likely underestimates the total number of miles traveled to and from campus, since it does not take into account side trips respondents might make on the way to or from campus (for instance stopping at the store, to pickup children, or visit friends), or trips away from campus during the middle of the day (such as to go to lunch or to an off-site meeting).

We estimate the number of miles (person-miles, versus vehicle-miles, described below) traveled each day as the doubled network distance between respondents' geocoded home location and the Silo on campus (as described in Appendix E), multiplied times the percent of weekdays a respondent travels to campus. Thus if a person lives 10 miles from campus and traveled to campus all five days, her average daily person-miles would be 20 miles; if she traveled to campus only one day, her average daily person-miles would be 4 miles. We further attribute person-miles to each mode based on the share of weekdays a respondent used each mode during the reference week. Thus, if a respondent biked one day and drove four, we would count 20 percent of his miles as bike miles and 80 percent as driving miles. Summed across all respondents, this represents person-miles traveled by each mode on an average weekday. We weight and inflate responses by role group to estimate a projection of the total person-miles traveled in the entire population.

To estimate the number of person-miles traveled annually, we first assume that respondents travel the same number of days per week and using the same modes as in the reference week for the entire 36 weeks of the academic year. Then to estimate summer travel, we rely on responses to questions *Q0056* and *Q0057* about the number of weeks and average number of days per week traveled to campus during the summer, but assuming they used modes used during the survey reference week. For instance, annual miles biked = (distance from campus × 2) × (share of days biked during reference week) × [(36 weeks × 5 days/week) + (weeks traveled to campus during the summer × days/week traveled per summer)].

To estimate vehicle-miles traveled (VMT), we assume that each person-mile contributes a fractional vehicle-mile equivalent to one divided by vehicle occupancy, for any travel in a private vehicle or public transit vehicle (including driving alone, carpooling, getting a ride, riding a bus, and riding a train). We assume that travel by walking, biking, or skating contributes no VMT. Vehicle occupancy for carpooling and getting a ride varies for each respondent, as reported in questions *Q0016* and *Q0017* for those carpooling/vanpooling or getting a ride, respectively. If a respondent lives 10 miles from campus and traveled in a 3-person carpool all five weekdays, her average daily VMT would be $(10 \text{ miles} \times 2) / 3 = 6.67$ miles. Occupancy for those driving alone and for those who got a ride and were the only person dropped off on campus by the person giving them a ride was assumed to be one.

For bus and train occupancy, we assume average occupancy for all trips on those modes. In particular, we estimated average bus occupancy based on annual ridership data from Unitrans, since the majority of bus riders use Unitrans. According to 2007 figures from the National Transit Database, Unitrans provided 6,560,904 annual passenger miles and 736,797 vehicle revenue miles, suggesting an average of about 8.90 passengers per mile.⁵ Thus, for someone who lives 10 miles from campus and traveled by bus all five weekdays, average VMT per day is $(10 \text{ miles} \times 2) / 8.90 = 2.25$ vehicle-miles.

We estimated train occupancy based on annual ridership data from the Capitol Corridor, since they provide the majority of train rides to campus. According to figures in the Capitol Corridor Business Plan Update, the Capitol Corridor provided 110,036,259 passenger-miles and 1,183,109 train-miles of service in FY2007-08, suggesting an average of about 93.0 passengers per mile.⁶ So if a respondent lives 100 miles from campus and traveled by train all five days, her average VMT per day is estimated to be $(100 \text{ miles} \times 2) / 93.0 = 2.15$ vehicle-miles.

Our estimates for the aggregate number of person-miles traveled and vehicle-miles traveled, by mode and role, are shown in Table 31.

Carbon emissions

Because our results include estimates of miles traveled by mode, we can use estimates of emissions per mile traveled on each mode to estimate the overall carbon dioxide (or other) emissions associated with campus travel. We estimate the amount of CO₂ produced by campus travelers by assuming that each mode of travel generates a certain quantity of carbon (pounds equivalent) per mile and multiplying this times our estimate of person-miles by each mode for an average weekday (see Table 31). To simplify, we do not take into account emissions associated with the manufacture of bicycles or vehicles, or of home energy use for those working from home. Thus we assume biking, walking, skating, working from home, or otherwise not traveling contributes no emissions. We use estimates for pounds equivalent of carbon produced per passenger-mile by car, bus, and train generated by TravelMatters.org, as summarized in Table 32.⁷ Estimates of the aggregate amount of carbon produced by roundtrip travel to and from campus on an average weekday are shown in Table 33; annual estimates

⁵ U.S. Department of Transportation, Federal Transit Administration, 2007 National Transit Database, Annual Transit Profile, Unitrans - City of Davis/ASUCD (NTD ID 9142), available from <http://www.ntdprogram.gov/ntdprogram/data.htm>.

⁶ *Capitol Corridor Intercity Passenger Rail Service Business Plan Update FY 2009-10 – FY 2010-11*, Appendix C, available from http://www.capitolcorridor.org/about_ccjpa/business_plan.php.

⁷ From *TravelMatters* website, Individual Emissions Calculator Methodology, available online at <http://www.travelmatters.org/calculator/individual/methodology><http://www.travelmatters.org/calculator/individual/methodology>.

are shown in Table 34. As with our estimates of total miles traveled on which these are based, side trips made on the way to or from campus, and any trips made in the middle of the day are not taken into account.

Table 31. Aggregate person-miles and vehicle-miles traveled, by mode and role, daily and annually

	Projected population ^a	Aggregate roundtrip miles traveled		Vehicle-miles per passenger-mile	Aggregate roundtrip vehicle-miles traveled	
		Daily average	Annual total		Daily average	Annual total
<i>By mode</i>						
Bike	14,585	49,535	10,370,030	0	0	0
Walk	2,027	5,002	1,023,682	0	0	0
Skate	123	690	127,164	0	0	0
Drive alone	8,826	242,831	54,144,273	1	242,831	54,144,273
Carpool or ride	2,190	56,212	13,017,935	Varies ^b	30,712	7,031,163
Bus	7,218	45,218	9,420,881	0.112 ^c	5,064	1,055,139
Train	286	25,466	5,132,099	0.0108 ^d	274	55,170
Work from home	518	22,420	4,412,479	0	0	0
Other no travel	3,264	76,364	15,543,233	0	0	0
<i>By role</i>						
Freshmen	4,597	10,042	1,833,720		2,811	515,858
Sophomores	4,498	23,761	4,457,387		7,354	1,377,840
Juniors	5,796	43,121	8,310,617		25,076	4,728,812
Seniors	7,721	61,238	12,425,800		34,371	6,912,707
Masters	1,926	20,452	4,014,797		12,684	2,464,498
PhD	3,636	45,075	9,355,770		25,321	5,313,534
Faculty	2,079	29,642	6,402,173		18,234	4,023,826
Staff	9,309	191,623	46,435,800		153,029	36,948,670
Students	28,174	203,689	40,398,091		107,618	21,313,249
Undergraduate	22,612	138,162	27,027,523		69,613	13,535,217
Graduate	5,562	65,527	13,370,568		38,005	7,778,032
Employees	11,388	221,265	52,837,973		171,263	40,972,496
Outside Davis	8,831	320,280	71,170,207		250,298	55,975,700
Within Davis	30,731	104,674	22,065,857		28,584	6,310,045
Overall	39,562	424,954	93,236,064		278,881	62,285,745

Data weighted by role for 3,451 cases successfully geocoded by zip code and cross streets (given in Q0050 and Q0051 or Q0087 and Q0088, or dorm name given in Q0005) and with non-missing mode choice data in question Q0011 (see Table 6). Mode use is based on responses to question Q0011 (for travel mode) and questions Q0013 and Q0023 through Q0027 (for days working from home or not traveling to campus), as reported in Table 10. Distances between respondents' homes and campus are calculated network distances based on zip code and cross streets given in questions Q0050 and Q0051 or Q0087 and Q0088, or dorm name given in Q0005, as described in Appendix E.

^a Projected number people in the overall population using this mode on an average weekday or projected number of people in this role group.

^b Based on carpool size or number of passengers dropped off, as reported by respondents in questions Q0016 and Q0017.

^c Based on estimated average occupancy of Unitrans buses, as described in the text, (1/8.90 ≈ 0.112).

^d Based on estimated average occupancy of Capitol Corridor trains, as described in the text, (1/93.0 ≈ 0.0108).

Table 32. Assumed carbon emitted per passenger-mile for each mode

Mode	Pounds CO ₂ per mile ^c
Driving alone	1.1
Carpool or getting a ride ^a	1.1/vehicle occupancy
Bus ^b	0.90
Train	0.46

^a Adjusted for each respondent according to the reported number of passengers in the carpool.

^b This figure is the basis for the “high” estimate of bus emissions in Table 33 and Table 34.

^c Source: *TravelMatters* website, Individual Emissions Calculator Methodology, available online at <http://www.travelmatters.org/calculator/individual/methodology>.

Note about per-mile carbon emissions for bus and train trips

It should be noted that bus and train passengers don’t actually generate additional carbon emissions by riding the bus or train on a particular day, given that the bus or train is going to operate anyway, regardless of his choice to ride that day. If the service will be provided regardless of whether he rides, then emissions associated with that choice are marginally zero. Switching from driving to riding the bus in this scenario removes all the carbon that would have been generated by driving a car, and adds nothing. However, overall transit operations may have implications for the campus’s carbon footprint. In particular, if Unitrans adds bus service to support campus commuters, then carbon emissions may be reduced to the extent that the new riders would have otherwise driven cars and that the buses are full. On the other hand, if Unitrans attracts riders that might have otherwise biked or walked or if buses are relatively empty, then additional bus ridership may actually increase the campus’s overall carbon footprint.

A second caveat regarding the per passenger-mile emissions levels estimated by TravelMatters.org is that they are based on nationwide averages of bus service operations and nationwide averages of Amtrak operations. The assumed fuel economy for transit vehicles and the typical vehicle occupancy may or may not be accurate for Unitrans and the Capitol Corridor services, which provide the majority of bus and train rides for UC Davis commuters. In particular, we might expect per-passenger emissions on Unitrans to be lower than national averages, because of more reliance on compressed natural gas (CNG) rather than diesel fuel for Unitrans buses, and because of the relatively high numbers of riders per bus, on average. In particular, according to the National Transit Database (for fiscal year 2007), Unitrans buses consumed 235,300 gallons of CNG and 17,600 gallons of diesel⁸ while providing 6,560,904 passenger-miles of service.⁹ Assuming 22.14 and 0.89 pounds of carbon per gallon of diesel and CNG, respectively,¹⁰ then Unitrans operations generated 599,248 pounds of carbon in fiscal year 2007, or just 0.091 pounds per passenger-mile of service. Estimates assuming this lower level of emissions per passenger-mile are shown in the “low” columns of Table 33 and Table 34, whereas estimates assuming the higher estimate of 0.90 pounds per passenger-mile are shown in the “high” columns.

Estimates specific to Capitol Corridor operations are harder to estimate due a lack of available data. Fuel economy per train is unknown (and difficult to estimate since Amtrak nationwide uses an unknown mix of diesel and electric power, and no data are published on Capitol Corridor fuel use). We might expect fuel economy on Capitol Corridor trains to be higher than intercity Amtrak trains, because

⁸ U.S. Department of Transportation, Federal Transit Administration, 2007 National Transit Database, Annual Data Tables, RY 2007, Table 17. Available from <http://204.68.195.57/ntdprogram/data.htm>.

⁹ U.S. Department of Transportation, Federal Transit Administration, 2007 National Transit Database, Annual Transit Profile, Unitrans - City of Davis/ASUCD (NTD ID 9142). Available from <http://www.ntdprogram.gov/ntdprogram/data.htm>.

¹⁰ See Appendix F of this report.

they may have fewer baggage and service cars. Another factor is the number of passengers per train, which appears to be lower on average on Capitol Corridor trains than on Amtrak trains nationwide, but this may be due to their pulling a fewer number of cars per train. (Nationwide, Amtrak provided 5,784 million passenger-miles in 2007 and 36,484 thousand train-miles, or an average of about 159 passengers per train.¹¹ In the same year, the Capitol Corridor provided 110,036,259 passenger-miles of service via 1,183,109 train-miles, or about 93 passengers per train.¹²) For lack of a better estimate, we use the TravelMatters.org estimate of 0.46 pounds per passenger mile in Table 33 and Table 34.

Using these assumptions, we estimate that travel to campus generates a total of 357,438 pounds equivalent of carbon on an average weekday, or about 9 pounds per person (Table 33). This sums to about 35,831 metric tons per year, or 0.91 metric tons per person (Table 34). Employees, and those living outside of Davis in general, generate substantially more carbon emissions than students, on average.

Note that the estimate presented here are not directly comparable to those based on the 2007-08 data (as in Congleton 2009), because of differences in the methodology for estimating distances traveled (see Appendix E) as well as for estimating the associated amount of carbon generated.

Table 33. Estimated daily carbon emissions by mode and role

Role group	Pounds equivalent of CO ₂ generated on an average weekday						Average per person ^b	Projected population
	Drive alone	Carpool or ride	Bus (high) ^a	Bus (low) ^a	Train	Total ^b		
Freshmen	2,300	644	1,064	108	110	4,226	0.92	4,597
Sophomores	6,064	1,063	6,970	707	330	15,135	3.36	4,498
Juniors	23,346	3,097	8,264	839	355	35,902	6.19	5,796
Seniors	33,533	2,331	14,040	1,425	856	52,185	6.76	7,721
Masters	13,214	612	628	64	1,578	16,095	8.36	1,926
PhD	25,678	1,785	2,181	221	3,573	33,439	9.20	3,636
Faculty	17,823	2,090	593	60	2,438	23,005	11.07	2,079
Staff	145,156	22,160	6,956	706	2,473	177,451	19.06	9,309
Students	104,135	9,533	33,147	3,364	6,803	156,982	5.57	28,174
Undergraduate	65,243	7,136	30,338	3,079	1,652	107,448	4.75	22,612
Graduate	38,891	2,397	2,809	285	5,151	49,534	8.91	5,562
Employees	162,979	24,251	7,550	766	4,911	200,457	17.60	11,388
Outside Davis	243,640	29,338	14,966	1,519	11,696	301,159	34.10	8,831
Within Davis	23,474	4,446	25,731	2,611	18	56,280	1.83	30,731
Overall	267,114	33,783	40,696	4,130	11,714	357,438	9.03	39,562
Average lbs/ person	30.26	15.43	5.64	0.57	40.90	9.03	9.03	
Projected population	8,826	2,190	7,218	7,218	286	39,562		39,562

^a High estimates assume 0.90 pounds/passenger-mile (as estimated by TravelMatters.org). Low estimates assume 0.091 pounds/passenger-mile, as estimated using Unitrans data on annual fuel use and passenger-miles of service provided (as reported for fiscal year 2007 in the National Transit Database). See text for further explanation and references.

^b Total and average based on “high” estimate for bus emissions.

¹¹ U.S. Department of Energy, Center for Transportation Analysis, *Transportation Energy Data Book*, Edition 28, 2009, Table 9.10. Available from <http://cta.ornl.gov/data/chapter9.shtml>.

¹² *Capitol Corridor Intercity Passenger Rail Service Business Plan Update FY 2009-10 – FY 2010-11*, Appendix C, available from http://www.capitolcorridor.org/about_ccjpa/business_plan.php.

Table 34. Estimated annual carbon emissions by mode and role

Role group	Metric tons equivalent of CO ₂ generated annually						Average per person ^b	Projected pop.
	Drive alone	Carpool or ride	Bus (high) ^a	Bus (low) ^a	Train	Total ^b		
Freshmen	192	54	88	9	9	351	0.08	4,597
Sophomores	513	92	599	61	27	1,291	0.29	4,498
Juniors	1,985	271	746	76	34	3,112	0.54	5,796
Seniors	3,041	227	1,311	133	70	4,782	0.62	7,721
Masters	1,163	56	59	6	137	1,419	0.74	1,926
PhD	2,447	168	207	21	310	3,152	0.87	3,636
Faculty	1,788	206	62	6	210	2,272	1.09	2,079
Staff	15,887	2,435	774	79	275	19,450	2.09	9,309
Students	9,341	867	3,010	305	586	14,108	0.50	28,174
Undergraduate	5,731	643	2,744	278	140	9,537	0.42	22,612
Graduate	3,610	223	266	27	446	4,572	0.82	5,562
Employees	17,675	2,642	836	85	485	21,722	1.91	11,388
Outside Davis	24,642	3,056	1,485	151	1,069	30,403	3.44	8,831
Within Davis	2,373	452	2,361	240	2	5,428	0.18	30,731
Overall	27,015	3,508	3,846	390	1,071	35,831	0.91	39,562
Average tons/person	3.06	1.60	0.53	0.05	3.74	0.91	0.91	
Projected pop.	8,826	2,190	7,218	7,218	286	39,562		39,562

^a High estimates assume 0.90 pounds/passenger-mile (as estimated by TravelMatters.org). Low estimates assume 0.091 pounds/passenger-mile, as estimated using Unitrans data on annual fuel use and passenger-miles of service provided (as reported for fiscal year 2007 in the National Transit Database). See text for further explanation and references.

^b Total and average based on “high” estimate for bus emissions.

Vehicle type

Anyone who reported traveling to campus by driving, carpooling, or getting a ride during the reference week (based on question *Q0010*) was asked to indicate the vehicle type and technology (questions *Q0014* and *Q0015*). Table 35 and Table 36 summarize the results. About 6 percent of respondents reported using a hybrid, electric, or alternative-fuel vehicles, while about 20 percent used a truck or SUV.

Table 35. Type of vehicles used for commuting to and from campus

	Percent using a vehicle ^a	Among those using a vehicle ^a , percent of people using:						Weighted sample	Projected pop.
		Regular car	SUV	Truck	Van / stationwagon	Motorcycle / scooter	Other / no response		
Overall	54.5%	66.6%	13.2%	7.1%	7.2%	0.6%	5.3%		
Weighted sample	2,143	1,427	284	152	153	13	115	3,933	
Projected pop.	21,560	14,351	2,853	1,529	1,544	129	1,153		39,562

Data are weighted by role based on the 3,935 valid responses to *Q0008* (see Table 6). Results are based on responses to questions *Q0014*.

^a All those who reported driving alone, carpooling, or getting a ride for *any* travel between home and campus during the reference week, as reported in question *Q0010*. This is a larger percent than those who used these modes as their *primary* mode to campus on an average weekday (Table 10) or on at least one of the days during the reference week (Table 11).

Table 36. Type of vehicle technology used for commuting to and from campus

	Percent using vehicle	Among those using a vehicle ^a , percent of people using:				Weighted sample	Projected pop.
		Regular gasoline or diesel	Hybrid	Electric	Alt. fuel		
Overall	54.5%	90.3%	4.0%	0.2%	0.2%		
Weighted sample	2,143	1,936	86	4	5	3,933	
Projected pop.	21,560	19,471	870	44	48		39,562

Data are weighted by role based on the 3,935 valid responses to Q0008 (see Table 6). Results are based on responses to questions Q0014.

^a All those who reported driving alone, carpooling, or getting a ride for any travel between home and campus during the reference week, as reported in question Q0010. This is a larger percent than those who used these modes as their primary mode to campus on an average weekday (Table 10) or on at least one of the days during the reference week (Table 11).

Bicycle type

Respondents who indicated using a bike to get to campus during the reference week were asked where they originally acquired the bike they used, offering some suggestion as to the type of bike, with higher-quality bikes most likely obtained from a specialty bike shop. Table 37 shows that about a third of respondents who cycled purchased their bike from a retailer specializing in bikes, but with variation across role groups. In particular, graduate students are more likely than others to purchase a bike from a private party such as through Craigslist.com (with 32 percent of grad-student cyclists versus 21 percent of employee cyclists reporting this source), while undergraduates are more likely than others to purchase a bike from a department store (with 25 percent of cyclists reporting this source, compared to 13 percent and 7 percent of graduate and employee cyclists, respectively).

Table 37. Source of bikes used for commuting to campus

Role group	Percent who biked ^a	Among those who biked, source of the bike they rode last week ^b					Weighted sample	Projected pop.
		Bike store	Private party	Dept store	Given/found	Other		
Undergraduates	60.7%	27.3%	25.3%	25.2%	20.8%	1.3%	2,187	22,612
Graduate students	62.3%	38.0%	32.1%	13.1%	14.0%	2.8%	546	5,562
Employees	28.9%	58.9%	20.5%	6.6%	11.1%	2.9%	1,120	11,388
Overall	51.7%	34.3%	25.7%	20.1%	18.1%	1.8%		
Weighted sample	1,991	1,321	990	775	696	70	3,853	
Projected pop.	20,438	13,566	10,168	7,962	7,145	721		39,562

Data are weighted by role based on the 3,935 valid responses to Q0008 (see Table 6). Results are based on responses to question Q0019.

^a Those who biked to campus at least once during the reference week (based on responses to question Q0011).

^b As worded in question Q0019, the categories were described as follows: “From a bike shop (a retailer specializing in bikes)” ; “a private party (friend, Craigslist.com, garage sale)” ; “From a department store that sells more general merchandise (such as Sears, Target, Walmart, etc.)” ; “Someone gave it to me or I found it” ; “From the UC Davis Bike Auction” ; or “Other.”

Crashes

Table 38 shows the percent of respondents who experienced a collision or crash while biking, walking, or traveling by car to or on campus within the last year “that damaged your car/bike or caused you personal injury.” In retrospect, this may have been too inclusive a definition, failing to distinguish from minor and major incidents. Almost 1 in 5 who have biked at some point in the last year report having had a crash that fits this criteria, or a projected 7,415 people annually. By contrast, less than 3 percent report experiencing a collision while in a car or while walking. Table 39 shows a breakdown of

reported experiences with bike crashes by role group. The share of employees reporting crashes is about half that among undergraduates, although exposure rates may differ across groups (that is, the amount of time an individual has spent on a bike over the course of the year).

Table 38. Bike, walk, and auto crashes

Mode	At any time in the last year, while traveling to, from, or on campus, were you in a crash or collision that damaged the car/bike or caused you personal injury?			Weighted sample	Projected population
	Percent not applicable, haven't tried	Percent yes	Percent yes, among applicable		
While biking	26.1%	13.9%	18.7%	3,604	39,562
While walking	10.1%	2.8%	3.2%	3,603	39,562
While traveling by car	10.3%	2.6%	2.8%	3,611	39,562

Data are weighted by role based on the 3,935 valid responses to Q0008 (see Table 6). Results are based on responses to questions Q0069 through Q0071.

Table 39. Bike crashes within the last year, by role

Role group	Percent not applicable, haven't biked	Percent crashed	Percent crashed, among applicable	Weighted sample	Projected population
Freshmen	12.7%	15.8%	18.1%	405	4,597
Sophomores	7.9%	27.2%	29.6%	407	4,498
Juniors	25.4%	15.4%	20.6%	537	5,796
Seniors	23.2%	15.9%	20.7%	701	7,721
Masters	28.9%	10.2%	14.3%	178	1,926
PhD	16.1%	15.8%	18.8%	341	3,636
Faculty	31.4%	7.0%	10.1%	193	2,079
Staff	46.5%	5.4%	10.0%	842	9,309
Students	19.0%	17.2%	21.2%	2,568	28,174
Undergraduate	18.7%	18.0%	22.1%	2,050	22,612
Graduate	20.5%	13.9%	17.4%	518	5,562
Employees	43.7%	5.7%	10.1%	1,035	11,388
Outside Davis	59.4%	2.1%	5.1%	829	8,831
Within Davis	16.2%	17.4%	20.7%	2,775	30,731
Overall	26.1%	13.9%	18.7%	3,604	39,562
Projected population	10,327	5,480	5,480		39,562

Data are weighted by role based on the 3,935 valid responses to Q0008 (see Table 6). Results are based on responses to question Q0069.

Bicycle theft

Table 40 through Table 42 show findings on bicycle theft. In contrast to the 2007-08 survey, the wording of the survey questions relating to bike theft in the 2008-09 survey (question q0058) asked respondents if they had *ever* had a bike stolen (whereas the 2007-08 survey asked respondents if they had a bike stolen in the last three years).

We find that about one in five respondents who have ever brought a bike to campus had a least one stolen (Table 40). Of these, almost a third has had more than one bike stolen (Table 41). We find that bikes purchased at a general department store (such as Walmart) have the highest rate of theft relative to the share of cyclists using bikes from that source (Table 42).

Table 40: Victims of bike theft, by role

Role group	Percent not applicable, haven't tried	Percent yes	Percent yes, among applicable	Weighted sample	Projected population
Freshmen	10.2%	4.9%	5.4%	423	4,597
Sophomores	6.7%	18.7%	20.0%	416	4,498
Juniors	19.9%	19.4%	24.2%	546	5,796
Seniors	17.3%	25.3%	30.6%	721	7,721
Masters	23.9%	6.5%	8.5%	181	1,926
PhD	9.4%	16.1%	17.8%	343	3,636
Faculty	16.8%	16.8%	20.2%	195	2,079
Staff	29.0%	17.3%	24.4%	862	9,309
Students	14.4%	17.3%	20.2%	2,630	28,174
Undergraduate	14.4%	18.4%	21.5%	2,107	22,612
Graduate	14.4%	12.8%	15.0%	523	5,562
Employees	26.8%	17.2%	23.5%	1,057	11,388
Outside Davis	41.6%	14.0%	23.9%	854	8,831
Within Davis	10.9%	18.2%	20.5%	2,834	30,731
Overall	18.0%	17.2%	21.0%	3,688	39,562
Projected population	7,110	6,824	6,824		39,562

Data are weighted by role based on the 3,935 valid responses to Q0008 (see Table 6). Results are based on responses to question Q0058.

Table 41. In total, how many bikes have been stolen from you on the UC Davis campus?

Number of bikes ever stolen	Percent among total	Percent among those with at least one stolen	Total	
			Weighted sample	Population projection
None	64.8%		2,389	25,638
One	12.2%	70.8%	449	4,824
Two	4.0%	23.0%	146	1,564
Three	0.9%	5.1%	32	345
Four or more	0.2%	1.2%	7	79
Not applicable (no bike)	18.0%		663	7,113
Total	100.0%		3,686	39,562

Data are weighted by role based on the 3,935 valid responses to Q0008 (see Table 6). Results are based on responses to question Q0059.

Table 42. Where had you originally acquired the bike(s) that were stolen?

Source	Where stolen bike was originally acquired				Where current riders acquired their bikes, as percent of all cyclists	Ratio of thefts from this source to current riders of bikes from this source
	Percent of theft victims	Percent of all cyclists	Weighted sample	Population projection		
Bike store	33.5%	12.3%	245	2,513	34.3%	0.56
Private party	24.2%	8.9%	177	1,820	25.7%	0.53
Dept store	23.8%	8.7%	174	1,785	20.1%	0.77
Given/found	14.8%	5.5%	109	1,114	18.1%	0.43
Other	3.7%	1.4%	27	278	1.8%	2.95
Total theft victims	100.0%	36.7%	732	7,511		
Total bikers		100.0%	1,991	20,438	100.0%	

Data are weighted by role based on the 3,935 valid responses to Q0008 (see Table 6). Results are based on responses to question Q0060.

Overnight bike parking

Question *Q0061* asked respondents if they “regularly” leave a bike on campus overnight, in an attempt to estimate the number of bikes parked on campus that are not abandoned and to better understand how these are used. Overall, about 18 percent of respondents affirmed that they regularly leave a bike on campus, although there could be substantial variation in how “regularly” (Table 43). This figure would suggest that about 7,170 bikes are intentionally parked on campus overnight on a regular basis by individuals who are still affiliated with UC Davis. About three-quarters of those who report leaving bikes have ridden their bike within the last week, though about 12 percent report that it has been more than a month (Table 44). Respondents who leave bikes overnight were also asked to choose from among a list of reasons that best fit why they tend to leave a bike on campus (Table 45) and whether other particular circumstances apply (Table 46). Based on these findings, we estimate that there are about 810 bikes regularly left overnight whose owners are still affiliated with the campus, but the bike is in disrepair or has a lost lock key.

Table 43. Do you regularly leave a bike on campus overnight?

Role group	Percent yes	Total	
		Weighted sample	Projected population
Freshmen	62.0%	420	4,597
Sophomores	22.6%	413	4,498
Juniors	18.2%	543	5,796
Seniors	11.2%	715	7,721
Masters	6.8%	180	1,926
PhD	9.3%	340	3,636
Faculty	7.3%	194	2,079
Staff	8.4%	853	9,309
Students	22.1%	2,611	28,174
Students off-campus	13.4%	2,096	22,611
Undergraduate (all)	25.5%	2,091	22,612
Graduate (all)	8.4%	520	5,562
Employees	8.2%	1,047	11,388
Outside Davis	12.6%	841	8,831
Within Davis (all)	19.8%	2,817	30,731
Within Davis, but off campus	11.3%	2,291	24,989
On campus	56.4%	528	5,754
Overall	18.1%	3,658	39,562
Weighted sample	663		
Projected population	7,170		

Data are weighted by role based on the 3,935 valid responses to *Q0008* (see Table 6). Results are based on responses to question *Q0061*.

Table 44. Time elapsed since campus bike was last ridden

About how long has it been since you rode the bike that you leave on campus overnight?	Among those who regularly leave a bike on campus overnight and are:				
	Living on campus	Living off campus			
		Students	Employees	Within Davis	Outside Davis
One day or less	81.8%	43.3%	36.6%	41.2%	43.0%
2-7 days	8.8%	32.0%	39.8%	34.2%	32.8%
8-14 days	1.1%	6.2%	12.5%	7.2%	8.9%
15-30 days	0.7%	3.7%	3.7%	3.4%	4.5%
31 days or more	7.6%	14.8%	7.4%	14.0%	10.8%
Weighted sample	297	283	84	261	105
Projected population	3,295	3,025	912	2,804	1,141

Data are weighted by role based on the 3,935 valid responses to Q0008 (see Table 6). Results are based on responses to question Q0062. Only asked of those who answered “Yes” to Q0061, “Do you regularly leave a bike on campus overnight?”

Table 45. What are the main reasons you leave a bike on campus overnight?

Reason	“Yes” as reason, among those who regularly leave bike on campus overnight and live off campus			
	Students	Employees	Living off campus	
			Within Davis (but off campus)	Beyond Davis
To get around during the day	82.1%	90.9%	80.2%	94.1%
To go downtown without losing my parking space	7.3%	14.4%	6.5%	15.1%
For visitors to use	1.4%	2.7%	1.3%	2.7%
Just haven't bothered to take it home	35.6%	8.6%	36.8%	10.5%
Weighted sample	290	86	270	105
Population projection	3,025	912	2,804	1,141

Data are weighted by role based on the 3,935 valid responses to Q0008 (see Table 6). Results are based on responses to question Q0064. Only asked of those who answered “Yes” to Q0061, “Do you regularly leave a bike on campus overnight?” and who live off campus (based on responses to question Q0004).

Table 46. Potential that overnight bikes will be abandoned

Thinking about the bike you leave on campus, are any of the following true?	Among those who regularly leave a bike on campus overnight and are:				
	Living on campus	Living off campus			
		Students	Employees	Within Davis	Outside Davis
I plan to use it again at some point in the future.	99.7%	96.8%	97.1%	96.3%	98.1%
I forgot where I last parked the bike.	8.1%	8.1%	3.2%	7.3%	6.4%
The bike is broken or has a flat.	5.9%	12.5%	6.5%	12.2%	8.6%
I stopped riding it after suffering an illness or injury.	2.5%	5.8%	1.6%	5.0%	4.8%
I lost the key to my lock or my lock is stuck.	2.5%	2.7%	1.6%	2.0%	3.7%
Weighted sample	290	80	272	252	101
Projected population	3,295	3,025	912	2,804	1,141

Data are weighted by role based on the 3,935 valid responses to Q0008 (see Table 6). Results are based on responses to question Q0065. Only asked of those who answered “Yes” to Q0061, “Do you regularly leave a bike on campus overnight?”

Perceptions about existing and potential TAPS programs

Respondents were presented a list of services and asked to indicate for each, “It’s new to me,” “I’ve heard of it, but never used it,” or “I’ve used it.” Table 47 summarizes the responses for each service, and Table 48 compares responses for this year and last, for those items that appeared on both surveys. In addition, respondents were also presented a description of two different hypothetical programs, car sharing and bike sharing (see Appendix A for the descriptions of each that were presented to respondents as a part of questions *Q0077* through *Q0082*). Respondents were then asked how likely they thought it was that they or their visitors would use the service, on a five-point scale. The results are summarized in Table 49, indicating that about 23 percent (a projected 2,809 individuals) thought they were at least somewhat likely to use car sharing and about 52 percent (a projected 6,647 individuals) thought they were at least somewhat likely to use bike sharing on campus.

Table 47. Awareness of transportation services

Service	Have used it	Have heard of it	Never heard of it	Weighted sample size
Discounted transit passes	7.0%	36.7%	56.2%	3,548
Carpool/vanpool program	9.1%	53.8%	37.1%	3,550
Emergency ride home service	2.1%	37.3%	60.6%	3,558
24 free parking days for carpoolers/ transitpoolers	6.6%	27.5%	65.9%	3,557
Online ridematching service	1.6%	31.2%	67.2%	3,551
Yolo TMA Commuter Club	0.9%	12.0%	87.1%	3,547
www.sacregion511.org	2.2%	11.2%	86.5%	3,550
TAPS motorist assistance program	8.5%	40.5%	51.0%	3,551
Comet in-vehicle parking meters	2.7%	31.5%	65.8%	3,544
Bike lock-cutting service	3.1%	45.9%	51.0%	3,552
UC Davis Bike Auction	9.4%	75.0%	15.7%	3,549
Ten bike tire air stations around campus	33.3%	24.9%	41.7%	3,551

Data are weighted by role based on the 3,935 valid responses to question *Q0008* (see Table 6). Results are based on responses to question *Q0075*.

Table 48. Awareness of transportation services, 2008 versus 2007

Service	Never heard of it	
	2007-08 ^b	2008-09 ^a
Discounted transit passes	71.6%	56.2%
Carpool/vanpool program	43.1%	37.1%
Emergency ride home service	70.3%	60.6%
24 free parking days for carpoolers/ transitpoolers	75.5%	65.9%
Online ridematching service	73.7%	67.2%
Yolo TMA Commuter Club	89.6%	87.1%
www.sacregion511.org	89.7%	86.5%

^a See Congleton (2009).

^b Based on responses to question *Q0075*. Data are weighted by role based on the 3,935 valid responses to question *Q0008* (see Table 6).

Table 49. Interest in car sharing and bike sharing programs

Service	Asked among	How likely would you use it?					Weighted sample
		Very unlikely	Somewhat unlikely	Unsure	Somewhat likely	Very likely	
Car sharing on campus	100.0%	35.0%	18.1%	23.9%	15.9%	7.1%	3,581
Bike sharing							
You (your visitors) would use it on campus	100.0%	14.0%	13.8%	20.5%	34.9%	16.8%	3,534
You (your visitors) would use it to travel between Amtrak station / campus	100.0%	16.9%	13.2%	24.7%	28.2%	16.9%	3,566
You might use it instead of leaving a bike on campus overnight ^a	17.7%	27.9%	22.6%	22.2%	17.2%	10.1%	3,639
You would consider parking farther away than you do now ^b	29.3%	20.6%	13.7%	24.0%	28.9%	12.7%	3,807

Data are weighted by role based on the 3,935 valid responses to question Q0008 (see Table 6). Results are based on responses to questions Q0077 through Q0082.

^a This question (Q0081) was only asked of those who answered “Yes” to question Q0061, “Do you regularly leave a bike on campus overnight?”

^b This question (Q0082) was only asked of those who answered “On the UCD campus” to question Q0018, “Where did you (or whoever drove you) park” when traveling to campus last week?”

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APPENDICES

Appendix A: Survey instrument, 2008-09 Campus Travel Survey

Below is the full text of the survey instrument, shown without the formatting as it would have appeared to online survey-takers. Notes about the conditional display of questions based on respondents' prior answers are shown in brackets. Answer options that were offered as checkboxes in the online survey (allowing respondents to select more than one response) are denoted here with a . Answer options that were implemented either as radio buttons or as part of a dropdown list in the online survey (allowing respondents to select only one response) are denoted here with a . Questions that were required for respondents to proceed are denoted here with an asterisk. Figure 14 at the end of Appendix A shows a sample screenshot of a page from the online version of the survey.

2008-09 UC Davis Campus Travel Survey

Preliminary questions

Q0001: What is your primary role on campus?*

- Faculty
- Staff
- Student

[Only answer this question if you answered 'Student' to question '0001 ']

Q0002: Are you an undergraduate or a graduate student?*

- Freshman
- Sophomore
- Junior
- Senior
- Master's student
- PhD student
- Other: _____

Q0003: Do you go to the Davis campus regularly, either for work or classes?*

Please choose only one of the following:

- Yes
- No

[Only answer this question if you answered 'Yes' to question '0003 ']

Q0004: Do you live on campus?*

- I live on campus
- I live elsewhere in Davis
- I live outside of Davis
- I come from different places on different days

[Only answer this question if you answered 'Yes' to question '0003 ' /and/ if you answered 'I live on campus' to question '0004 ']

Q0005: What is the name of your campus residence? (building, area, etc.)

Please write your answer here: _____

Your travel between home and campus last week (Nov 3 - 9)

[Only answer this question if you answered 'Yes' to question '0003 ' /and/ if you answered 'I live elsewhere in Davis' or 'I live outside of Davis' or 'I come from different places on different days' to question '0004 ']

Q0006: Consider your travel between home and the UC Davis campus during the most recent week, Monday - Sunday (Nov 3 - 9). If you have a day planner, it might be useful to look at last week's activities as you complete this section.

[Only answer this question if you answered 'Yes' to question '0003 ' /and/ if you answered 'I live on campus' to question '0004 ']

Q0007: Consider your travel between where you live and other campus destinations during the most recent week, Monday - Sunday (Nov 3 - 9). If you have a day planner, it might be useful to look at last week's activities as you complete this section.

[Only answer this question if you answered 'Yes' to question '0003 ']

Q0008: Did you travel to campus destinations on any of the seven days last week (Mon-Sun, Nov 3 - 9)?*

- Yes
- No

[Only answer this question if you answered 'Yes' to question '0008 ']

Q0009: Which days of the week did you travel on campus?*

- Monday (Nov 3)
- Tuesday (Nov 4)
- Wednesday (Nov 5)
- Thursday (Nov 6)
- Friday (Nov 7)
- Saturday (Nov 8)
- Sunday (Nov 9)

[Only answer this question if you answered 'Yes' to question '0003 ' /and/ if you answered 'Yes' to question '0008 ']

Q0010: Did you use any of the following means of transportation to travel between home and campus destinations last week? (Please check anything you did on your way to your campus destination or on your way home.)

- Bike
 - Walk (7 minutes or more)
 - Skate
 - Drive yourself (arrive/depart alone)
 - Carpool or vanpool (arrive/depart with others)
 - Get a ride (dropped off by someone who goes elsewhere -- not to campus)
 - Ride a bus
 - Ride a train or light rail
 - Other:
-

[Only answer this question if you answered 'Yes' to question '0008 ']

Q011: What was your primary means of transportation from home _to_ your first campus destination each of these days?* If you used more than one means of transportation on a given day, indicate whichever one you used to travel the greatest amount of distance.

	Biked	Walked	Skated	Drove myself (arrived alone)	Carpooled or vanpooled (arrived with others)	Got a ride (dropped off by someone going elsewhere)	Bus	Train or light rail
Monday	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Tuesday	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Wednesday	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Thursday	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Friday	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Saturday	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sunday	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

 [Only answer this question if you answered 'Yes' to question '0008 ']

Q012: What time did you _first_ travel on campus each day? Please indicate whether you arrived between 6am and 10am or not.*

	Between 6am and 10am	Either before 6am or after 10am
Monday	<input type="radio"/>	<input type="radio"/>
Tuesday	<input type="radio"/>	<input type="radio"/>
Wednesday	<input type="radio"/>	<input type="radio"/>
Thursday	<input type="radio"/>	<input type="radio"/>
Friday	<input type="radio"/>	<input type="radio"/>
Saturday	<input type="radio"/>	<input type="radio"/>
Sunday	<input type="radio"/>	<input type="radio"/>

 [Only answer this question if you answered 'Yes' to question '0003 '/and/ if you answered 'No' to question '0008 ']

Q013: What was the main reason that you did not travel on campus last week?*

- Regularly scheduled days off
- Worked from home (or telecommuted)
- Sick
- Vacation
- Traveling for work (meetings, conference, field work)
- Other: _____

 [Only answer this question if you answered 'Yes' to question '0003 '/and/ if you answered 'Drive yourself (arrive/depart alone)' or 'Carpool or vanpool (arrive/depart with others)' or 'Get a ride (dropped off by someone who goes elsewhere -- not to campus)' to question '0010 ']

Q014: When traveling to campus last week, what type of vehicle did you use?* If you used a different vehicle on different days, please describe the one you used most often.

- Motorcycle or scooter
- SUV
- Truck
- Van or minivan
- Stationwagon
- Other car
- Other: _____

[Only answer this question if you answered 'Yes' to question '0003 ' /and/ if you answered 'Carpool or vanpool (arrive/depart with others)' or 'Drive yourself (arrive/depart alone)' or 'Get a ride (dropped off by someone who goes elsewhere -- not to campus)' to question '0010 ']

Q0015: Was this vehicle a hybrid, alternative fuel, or electric vehicle?*

- No, it is a regular gasoline- or diesel-powered vehicle
- Hybrid
- Electric
- Alternative fuel (biodiesel, propane, natural gas, or other)

[Only answer this question if you answered 'Yes' to question '0003 ' /and/ if you answered 'Carpool or vanpool (arrive/depart with others)' to question '0010 ']

Q0016: How many total people (including yourself) were in your carpool or vanpool?*

- 2 (you plus one other person)
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14
- 15
- 16 or more

[Only answer this question if you answered 'Yes' to question '0003 ' /and/ if you answered 'Get a ride (dropped off by someone who goes elsewhere -- not to campus)' to question '0010 ']

Q0017: When you got a ride to campus last week, how many people (including yourself) did your driver drop off on campus?*

- 1 (just you)
- 2 (you plus one other person)
- 3
- 4 or more

[Only answer this question if you answered 'Yes' to question '0003 ' /and/ if you answered 'Carpool or vanpool (arrive/depart with others)' or 'Drive yourself (arrive/depart alone)' or 'Get a ride (dropped off by someone who goes elsewhere -- not to campus)' to question '0010 ']

Q0018: Where did you (or whoever drove you) park?*

- On the UCD campus
- Within Davis, but not on campus
- I was dropped off (and the driver went elsewhere)
- Other: _____

[Only answer this question if you answered 'Yes' to question '0003 ' /and/ if you answered 'Bike' to question '0010 ']

Q0019: Where did you originally get the bike you rode on campus last week?

- From a bike shop (a retailer specializing in bikes)
- From a department store that sells more general merchandise (such as Sears, Target, Walmart, etc.)
- From a private party (friend, Craigslist.com, garage sale)
- From the UC Davis Bike Auction
- Someone gave it to me or I found it
- Other: _____

[Only answer this question if you answered 'Yes' to question '0003 ' /and/ if you answered 'Ride a bus' or 'Ride a train or light rail' to question '0010 ']

Q0020: Which buses or trains did you ride last week?* (Check all that apply.)

- | | |
|---|--|
| <input type="checkbox"/> Unitrans | <input type="checkbox"/> Davis Community Transit |
| <input type="checkbox"/> Yolobus | <input type="checkbox"/> Amtrak train |
| <input type="checkbox"/> Sacramento Regional Transit | <input type="checkbox"/> Amtrak motorcoach (bus) |
| <input type="checkbox"/> UCD/UCDMC Shuttle | <input type="checkbox"/> BART |
| <input type="checkbox"/> Fairfield Suisun Transit | <input type="checkbox"/> Other: _____ |
| <input type="checkbox"/> UC Berkeley - UC Davis shuttle | |

[Only answer this question if you answered 'Yes' to question '0003 ' /and/ if you answered 'Yes' to question '0008 ']

0021: Did you do any of the following activities while traveling from home to your first campus destination, or while traveling from your last campus destination back home, on any days last week? (For instance, while waiting for the bus, on the bus, on your bike, or in the car.)

	Not at all (none this week)	Sometimes (once to several times this week, or on one to several of your trips)	Frequently (many times this week, or throughout many of your trips)
Read or study	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Listen to an iPod, car stereo, or other audio player	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Send or receive text messages	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Talk on the phone	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Use a laptop	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Use the internet	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Do puzzles or games (sudoku, crosswords, solitaire)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sleep	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Talk with traveling companions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Talk with someone you encountered incidentally	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Pick up or drop someone off	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Stop anywhere along the way for errands or other activities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Reasons for not commuting (last week)

[Only answer this question if you answered 'Yes' to question '0003 ' /and/ if you answered 'Yes' to question '0008 ' /and/ if you have NOT answered 'Monday (Nov 3)' or 'Tuesday (Nov 4)' or 'Wednesday (Nov 5)' or 'Thursday (Nov 6)' or 'Friday (Nov 7)' to question '0009 ']

Q0022: What was the main reason that you did _not_ travel on campus this day last week?

[Only answer this question if you answered 'Yes' to question '0003 ' /and/ if you answered 'Yes' to question '0008 ' /and/ if you have NOT answered 'Monday (Nov 3)' to question '0009 ']

Q0023: Monday*

- Regularly scheduled day off (no work or classes)
 - Working from home or telecommuting
 - Traveling for work (meetings, conference, field work)
 - Sick
 - Vacation
 - Day off as part of a 3/36 compressed work week
 - Day off as part of a 4/40 compressed work week
 - Day off as part of a 9/80 compressed work week
 - Other (e.g. jury duty)
-

[Only answer this question if you answered 'Yes' to question '0003 ' and/ if you answered 'Yes' to question '0008 ' /and/ if you have NOT answered 'Tuesday (Nov 4)' to question '0009 ']

Q0024: Tuesday*

- Regularly scheduled day off (no work or classes)
 - Working from home or telecommuting
 - Traveling for work (meetings, conference, field work)
 - Sick
 - Vacation
 - Day off as part of a 3/36 compressed work week
 - Day off as part of a 4/40 compressed work week
 - Day off as part of a 9/80 compressed work week
 - Other (e.g. jury duty)
-

[Only answer this question if you answered 'Yes' to question '0003 ' /and/ if you answered 'Yes' to question '0008 ' /and/ if you have NOT answered 'Wednesday (Nov 5)' to question '0009 ']

Q0025: Wednesday*

- Regularly scheduled day off (no work or classes)
 - Working from home or telecommuting
 - Traveling for work (meetings, conference, field work)
 - Sick
 - Vacation
 - Day off as part of a 3/36 compressed work week
 - Day off as part of a 4/40 compressed work week
 - Day off as part of a 9/80 compressed work week
 - Other (e.g. jury duty)
-

[Only answer this question if you answered 'Yes' to question '0003 ' /and/ if you answered 'Yes' to question '0008 ' /and/ if you have NOT answered 'Thursday (Nov 6)' to question '0009 ']

Q0026: Thursday*

- Regularly scheduled day off (no work or classes)
- Working from home or telecommuting
- Traveling for work (meetings, conference, field work)
- Sick
- Vacation
- Day off as part of a 3/36 compressed work week
- Day off as part of a 4/40 compressed work week

- Day off as part of a 9/80 compressed work week
- Other (e.g. jury duty)

 [Only answer this question if you answered 'Yes' to question '0003 ' /and/ if you answered 'Yes' to question '0008 ' /and/ if you have NOT answered 'Friday (Nov 7)' to question '0009 ']

Q0027: Friday*

- Regularly scheduled day off (no work or classes)
- Working from home or telecommuting
- Traveling for work (meetings, conference, field work)
- Sick
- Vacation
- Day off as part of a 3/36 compressed work week
- Day off as part of a 4/40 compressed work week
- Day off as part of a 9/80 compressed work week
- Other (e.g. jury duty)

Your typical travel between home and campus

[Only answer this question if you answered 'Yes' to question '0003 ']

Q0028: Next we ask about your typical travel between home and campus destinations, whether or not it's what you did last week.

 [Only answer this question if you answered 'Yes' to question '0003 ']

Q0029: About how many minutes does it usually take to get from home to your first campus destination on a given day (door-to-door), given your usual routine?*

- | | | |
|-------------------------------------|-------------------------------------|---|
| <input type="radio"/> 0-4 minutes | <input type="radio"/> 25-29 minutes | <input type="radio"/> 50-54 minutes |
| <input type="radio"/> 5-9 minutes | <input type="radio"/> 30-34 minutes | <input type="radio"/> 55-59 minutes |
| <input type="radio"/> 10-14 minutes | <input type="radio"/> 35-39 minutes | <input type="radio"/> 1 - 2 hours |
| <input type="radio"/> 15-19 minutes | <input type="radio"/> 40-44 minutes | <input type="radio"/> More than 2 hours |
| <input type="radio"/> 20-24 minutes | <input type="radio"/> 45-49 minutes | |

 [Only answer this question if you answered 'Yes' to question '0003 ']

Q0030: Do you typically use more than one mode of transportation to get from home to your first campus destination on a given day?* For instance, driving from home to a bus station and then taking a bus to campus would be two different modes. (Please count as a separate mode any portion of your trip that takes you 7 minutes or longer. You don't need to count shorter walking segments at the beginning and the end of your trip, but if you walk 7 minutes or more, please count it.)

- Yes, I typically use more than one mode
- No, I typically use only one mode of transportation

 [Only answer this question if you answered 'Yes' to question '0003 ' /and/ if you answered 'No, I typically use only one mode of transportation' to question '0030 ']

Q0031: What mode of transportation do you typically use to get from home to your first campus destination?*

- | | |
|--|---|
| <input type="radio"/> Bike | others going to campus) |
| <input type="radio"/> Walk (7 minutes or more) | <input type="radio"/> Get/give a ride (with others going elsewhere) |
| <input type="radio"/> Skate | <input type="radio"/> Ride Unitrans bus |
| <input type="radio"/> Drive myself (travel alone) | <input type="radio"/> Ride YOLOBUS |
| <input type="radio"/> Carpool/vanpool (travel with | |

- Ride Sacramento Regional Transit
- Ride the UCD/UCDMC Shuttle
- Ride Fairfield Suisun Transit bus
- Ride the UC Berkeley - UC Davis shuttle

- Ride Davis Community Transit
- Ride Amtrak train
- Ride Amtrak motorcoach (bus)
- Ride BART
- Ride other public transportation

[Only answer this question if you answered 'Yes' to question '0003 ' /and/ if you answered 'Yes, I typically use more than one mode' to question '0030 ']

Q0032: On a given day, what mode do you use _first_, starting from home?

- | | |
|--|---|
| <input type="radio"/> Bike | <input type="radio"/> Ride Sacramento Regional Transit |
| <input type="radio"/> Walk (7 minutes or more) | <input type="radio"/> Ride the UCD/UCDMC Shuttle |
| <input type="radio"/> Skate | <input type="radio"/> Ride Fairfield Suisun Transit bus |
| <input type="radio"/> Drive myself (travel alone) | <input type="radio"/> Ride the UC Berkeley - UC Davis shuttle |
| <input type="radio"/> Carpool/vanpool (travel with others going to campus) | <input type="radio"/> Ride Davis Community Transit |
| <input type="radio"/> Get/give a ride (with others going elsewhere) | <input type="radio"/> Ride Amtrak train |
| <input type="radio"/> Ride Unitrans bus | <input type="radio"/> Ride Amtrak motorcoach (bus) |
| <input type="radio"/> Ride YOLOBUS | <input type="radio"/> Ride BART |
| | <input type="radio"/> Ride other public transportation |

[Only answer this question if you answered 'Yes' to question '0003 ' /and/ if you answered 'Yes, I typically use more than one mode' to question '0030 ']

Q0033: How many minutes is this (_first_) part of your trip?

- | | | |
|-------------------------------------|-------------------------------------|---|
| <input type="radio"/> 0-4 minutes | <input type="radio"/> 25-29 minutes | <input type="radio"/> 50-54 minutes |
| <input type="radio"/> 5-9 minutes | <input type="radio"/> 30-34 minutes | <input type="radio"/> 55-59 minutes |
| <input type="radio"/> 10-14 minutes | <input type="radio"/> 35-39 minutes | <input type="radio"/> 1 - 2 hours |
| <input type="radio"/> 15-19 minutes | <input type="radio"/> 40-44 minutes | <input type="radio"/> More than 2 hours |
| <input type="radio"/> 20-24 minutes | <input type="radio"/> 45-49 minutes | |

[Only answer this question if you answered 'Yes' to question '0003 ' /and/ if you answered 'Yes, I typically use more than one mode' to question '0030 ']

Q0034: What is the _second_ mode you use?

- | | |
|--|---|
| <input type="radio"/> Bike | <input type="radio"/> Ride Sacramento Regional Transit |
| <input type="radio"/> Walk (7 minutes or more) | <input type="radio"/> Ride the UCD/UCDMC Shuttle |
| <input type="radio"/> Skate | <input type="radio"/> Ride Fairfield Suisun Transit bus |
| <input type="radio"/> Drive myself (travel alone) | <input type="radio"/> Ride the UC Berkeley - UC Davis shuttle |
| <input type="radio"/> Carpool/vanpool (travel with others going to campus) | <input type="radio"/> Ride Davis Community Transit |
| <input type="radio"/> Get/give a ride (with others going elsewhere) | <input type="radio"/> Ride Amtrak train |
| <input type="radio"/> Ride Unitrans bus | <input type="radio"/> Ride Amtrak motorcoach (bus) |
| <input type="radio"/> Ride YOLOBUS | <input type="radio"/> Ride BART |
| | <input type="radio"/> Ride other public transportation |

[Only answer this question if you answered 'Yes' to question '0003 ' /and/ if you answered 'Yes, I typically use more than one mode' to question '0030 ']

Q0035: About how many minutes is this (_second_) part of your trip?

- | | | |
|-------------------------------------|-------------------------------------|-------------------------------------|
| <input type="radio"/> 0-4 minutes | <input type="radio"/> 15-19 minutes | <input type="radio"/> 30-34 minutes |
| <input type="radio"/> 5-9 minutes | <input type="radio"/> 20-24 minutes | <input type="radio"/> 35-39 minutes |
| <input type="radio"/> 10-14 minutes | <input type="radio"/> 25-29 minutes | <input type="radio"/> 40-44 minutes |

- 45-49 minutes
- 50-54 minutes
- 55-59 minutes
- 1 - 2 hours
- More than 2 hours

 [Only answer this question if you answered 'Yes' to question '0003 ' /and/ if you answered 'Yes, I typically use more than one mode' to question '0030 ']

Q0036: Check here if you typically use an additional mode(s) to get to campus

 [Only answer this question if you answered 'Yes' to question '0003 ' /and/ if you answered ' ' to question '0036 ']

Q0037: What is the _third_ mode you use?

- Bike
- Walk (7 minutes or more)
- Skate
- Drive myself (travel alone)
- Carpool/vanpool (travel with others going to campus)
- Get/give a ride (with others going elsewhere)
- Ride Unitrans bus
- Ride YOLOBUS
- Ride Sacramento Regional Transit
- Ride the UCD/UCDMC Shuttle
- Ride Fairfield Suisun Transit bus
- Ride the UC Berkeley - UC Davis shuttle
- Ride Davis Community Transit
- Ride Amtrak train
- Ride Amtrak motorcoach (bus)
- Ride BART
- Ride other public transportation

 [Only answer this question if you answered 'Yes' to question '0003 ' /and/ if you answered ' ' to question '0036 ']

Q0038: About how many minutes is this (_third_) part of your trip?

- 0-4 minutes
- 5-9 minutes
- 10-14 minutes
- 15-19 minutes
- 20-24 minutes
- 25-29 minutes
- 30-34 minutes
- 35-39 minutes
- 40-44 minutes
- 45-49 minutes
- 50-54 minutes
- 55-59 minutes
- 1 - 2 hours
- More than 2 hours

 [Only answer this question if you answered 'Yes' to question '0003 ' /and/ if you answered ' ' to question '0036 ']

Q0039: Check here if you typically use an additional mode(s) to get to campus

 [Only answer this question if you answered 'Yes' to question '0003 ' /and/ if you answered ' ' to question '0039 ']

Q0040: What is the _fourth_ mode you use?

- Bike
- Walk (7 minutes or more)
- Skate
- Drive myself (travel alone)
- Carpool/vanpool (travel with others going to campus)
- Get/give a ride (with others going elsewhere)
- Ride Unitrans bus
- Ride YOLOBUS
- Ride Sacramento Regional Transit
- Ride the UCD/UCDMC Shuttle
- Ride Fairfield Suisun Transit bus
- Ride the UC Berkeley - UC Davis shuttle
- Ride Davis Community Transit
- Ride Amtrak train
- Ride Amtrak motorcoach (bus)
- Ride BART
- Ride other public transportation

[Only answer this question if you answered 'Yes' to question '0003 ' /and/ if you answered ' ' to question '0039 ']

Q0041: About how many minutes is this (_fourth_) part of your trip?

- 0-4 minutes
- 5-9 minutes
- 10-14 minutes
- 15-19 minutes
- 20-24 minutes
- 25-29 minutes
- 30-34 minutes
- 35-39 minutes
- 40-44 minutes
- 45-49 minutes
- 50-54 minutes
- 55-59 minutes
- 1 - 2 hours
- More than 2 hours

[Only answer this question if you answered 'Yes' to question '0003 ' /and/ if you answered ' ' to question '0039 ']

Q0042: Check here if you typically use an additional mode(s) to get to campus

[Only answer this question if you answered 'Yes' to question '0003 ' /and/ if you answered ' ' to question '0042 ']

Q0043: What is the _fifth_ mode you use?

- Bike
- Walk (7 minutes or more)
- Skate
- Drive myself (travel alone)
- Carpool/vanpool (travel with others going to campus)
- Get/give a ride (with others going elsewhere)
- Ride Unitrans bus
- Ride YOLOBUS
- Ride Sacramento Regional Transit
- Ride the UCD/UCDMC Shuttle
- Ride Fairfield Suisun Transit bus
- Ride the UC Berkeley - UC Davis shuttle
- Ride Davis Community Transit
- Ride Amtrak train
- Ride Amtrak motorcoach (bus)
- Ride BART
- Ride other public transportation

[Only answer this question if you answered 'Yes' to question '0003 ' /and/ if you answered ' ' to question '0042 ']

Q0044: About how many minutes is this (_fifth_) part of your trip?

- 0-4 minutes
- 5-9 minutes
- 10-14 minutes
- 15-19 minutes
- 20-24 minutes
- 25-29 minutes
- 30-34 minutes
- 35-39 minutes
- 40-44 minutes
- 45-49 minutes
- 50-54 minutes
- 55-59 minutes
- 1 - 2 hours
- More than 2 hours

[Only answer this question if you answered 'Yes' to question '0003 ' /and/ if you answered ' ' to question '0042 ']

Q0045: Check here if you typically use an additional mode(s) to get to campus

[Only answer this question if you answered 'Yes' to question '0003 ' /and/ if you answered ' ' to question '0045 ']

Q0046: What is the _sixth_ mode you use?

- Bike
- Walk (7 minutes or more)
- Skate
- Drive myself (travel alone)
- Carpool/vanpool (travel with others going to campus)

- Get/give a ride (with others going elsewhere)
- Ride Unitrans bus
- Ride YOLOBUS
- Ride Sacramento Regional Transit
- Ride the UCD/UCDMC Shuttle
- Ride Fairfield Suisun Transit bus

- Ride the UC Berkeley - UC Davis shuttle
- Ride Davis Community Transit
- Ride Amtrak train
- Ride Amtrak motorcoach (bus)
- Ride BART
- Ride other public transportation

[Only answer this question if you answered 'Yes' to question '0003 ' /and/ if you answered ' ' to question '0045 ']

Q0047: About how many minutes is this (sixth) part of your trip?

- | | | |
|-------------------------------------|-------------------------------------|---|
| <input type="radio"/> 0-4 minutes | <input type="radio"/> 25-29 minutes | <input type="radio"/> 50-54 minutes |
| <input type="radio"/> 5-9 minutes | <input type="radio"/> 30-34 minutes | <input type="radio"/> 55-59 minutes |
| <input type="radio"/> 10-14 minutes | <input type="radio"/> 35-39 minutes | <input type="radio"/> 1 - 2 hours |
| <input type="radio"/> 15-19 minutes | <input type="radio"/> 40-44 minutes | <input type="radio"/> More than 2 hours |
| <input type="radio"/> 20-24 minutes | <input type="radio"/> 45-49 minutes | |

[Only answer this question if you answered 'Yes' to question '0003 ' /and/ if you answered ' ' to question '0045 ']

Q0048: Check here if you typically use an additional mode(s) to get to campus

[Only answer this question if you answered 'Yes' to question '0003 ' /and/ if you answered 'I come from different places on different days' to question '0004 ']

Q0049: You indicated that you travel to campus from different places on different days. Please tell us about the two places you travel from most often. This will only be used to calculate the approximate distance you travel to campus. It will be kept confidential and will not be used in any other way.

[Only answer this question if you answered 'Yes' to question '0003 ' /and/ if you answered 'I come from different places on different days' to question '0004 ']

Q0050: Zip code of the first place:

Please write your answer here: _____

[Only answer this question if you answered 'Yes' to question '0003 ' /and/ if you answered 'I come from different places on different days' to question '0004 ']

Q0051: An intersection near this place:

Your street: _____

Nearest cross-street: _____

[Only answer this question if you answered 'Yes' to question '0003 ' /and/ if you answered 'I come from different places on different days' to question '0004 ']

Q0052: How many days a week do you typically travel from this place? (Or, if you typically do not return to this place at the end of the day on the days you come from here, please indicate how many round trips you make to campus from this place each week.)

- | | | |
|---|-------------------------------------|-------------------------------------|
| <input type="radio"/> Less than once per week | <input type="radio"/> 2 days a week | <input type="radio"/> 5 days a week |
| <input type="radio"/> 1 day a week | <input type="radio"/> 3 days a week | <input type="radio"/> 6 days a week |
| | <input type="radio"/> 4 days a week | <input type="radio"/> 7 days a week |

[Only answer this question if you answered 'Yes' to question '0003 ' /and/ if you answered 'I come from different places on different days' to question '0004 ']

Q0053: Zip code of the second place:

Please write your answer here: _____

[Only answer this question if you answered 'Yes' to question '0003 ' /and/ if you answered 'I come from different places on different days' to question '0004 ']

Q0054: An intersection near this place:

Your street: _____

Nearest cross-street: _____

[Only answer this question if you answered 'Yes' to question '0003 ' /and/ if you answered 'I come from different places on different days' to question '0004 ']

Q0055: How many days a week do you typically travel from this place?

- | | | |
|---|-------------------------------------|-------------------------------------|
| <input type="radio"/> Less than once per week | <input type="radio"/> 2 days a week | <input type="radio"/> 5 days a week |
| <input type="radio"/> 1 day a week | <input type="radio"/> 3 days a week | <input type="radio"/> 6 days a week |
| | <input type="radio"/> 4 days a week | <input type="radio"/> 7 days a week |

Summer activities

[Only answer this question if you answered 'Yes' to question '0003 ']

Q0056: How much time did you spend on campus during the past summer?* We're interested in the number of weeks you spent last summer traveling to and from campus destinations on a regular basis. Please estimate how many weeks you traveled on campus _at least once per week_ during the academic summer, June 16 - September 19, 2008. (Note: If you traveled to campus this entire period, that was 14 weeks.)

- | | |
|---|--|
| <input type="radio"/> All summer / 14 weeks (Jun 16-Sept 19) | <input type="radio"/> 6 weeks (equivalent to just _one_ Summer Session, I or II) |
| <input type="radio"/> 13 weeks | <input type="radio"/> 5 weeks |
| <input type="radio"/> 12 weeks (equivalent to Summer Session I & Summer Session II) | <input type="radio"/> 4 weeks |
| <input type="radio"/> 11 weeks | <input type="radio"/> 3 weeks |
| <input type="radio"/> 10 weeks | <input type="radio"/> 2 weeks |
| <input type="radio"/> 9 weeks | <input type="radio"/> 1 week |
| <input type="radio"/> 8 weeks | <input type="radio"/> None |
| <input type="radio"/> 7 weeks | |

[Only answer this question if you answered 'Yes' to question '0003 ' /and/ if you have NOT answered 'None' to question '0056 ']

Q0057: During this period, how many days per week did you travel on campus, on average?*

- | | |
|---------------------------------------|---------------------------------------|
| <input type="radio"/> 1 day per week | <input type="radio"/> 5 days per week |
| <input type="radio"/> 2 days per week | <input type="radio"/> 6 days per week |
| <input type="radio"/> 3 days per week | <input type="radio"/> 7 days per week |
| <input type="radio"/> 4 days per week | |

Bicycles on campus

Theft

[Only answer this question if you answered 'Yes' to question '0003 ']

Q0058: Have you ever been the victim of a bicycle theft on the UC Davis campus?

- Yes
- No
- Not applicable: I have never had a bike on campus

[Only answer this question if you answered 'Yes' to question '0003 ' /and/ if you answered 'Yes' to question '0058 ']

Q0059: In total, how many bikes have been stolen from you on the UC Davis campus?

- One
- Two
- Three
- Four or more

[Only answer this question if you answered 'Yes' to question '0003 ' /and/ if you answered 'Yes' to question '0058 ']

Q0060: Where had you originally acquired the bike(s) that were stolen? (If you've had multiple bikes stolen, please check all that apply.)

- From a bike shop (a retailer specializing in bikes)
- From a department store that sells more general merchandise (such as Sears, Target, Walmart, etc.)
- From a private party (friend, Craigslist.com, garage sale)
- From the UC Davis Bike Auction
- Someone gave it to more or I found it
- Other: _____

Bicycles on campus

[Only answer this question if you answered 'Yes' to question '0003 ' /and/ if you have NOT answered 'Not applicable: I have never had a bike on campus' to question '0058 ']

Q0061: Do you regularly leave a bike on campus overnight?

- Yes
- No

[Only answer this question if you answered 'Yes' to question '0003 ' /and/ if you answered 'Yes' to question '0061 ' /and/ if you have NOT answered 'Not applicable: I have never had a bike on campus' to question '0058 ']

Q0062: About how long do you think it has been since you rode the bike that you leave on campus overnight?

- One day or less
- 2-7 days
- 8-14 days
- 15-30 days
- 31 days or more

[Only answer this question if you answered 'Yes' to question '0003 ' /and/ if you answered 'Yes' to question '0061 ' /and/ if you have NOT answered 'Not applicable: I have never had a bike on campus' to question '0058 ']

Q0063: Where did you get the bike that you leave on campus overnight?

- From a bike shop (a retailer specializing in bikes)
- From a department store that sells more general merchandise (such as

- Sears, Target, Walmart, etc.)
- From a private party (friend, Craigslist.com, garage sale)
- From the UC Davis Bike Auction
- Someone gave it to me or I found it

 [Only answer this question if you answered 'Yes' to question '0003 ' /and/ if you have NOT answered 'I live on campus' to question '0004 ' /and/ if you answered 'Yes' to question '0061 ']

Q0064: What are the main reasons you leave a bike on campus? (Check all that apply.)

- To get around during the day
- To go downtown without losing my parking space
- For visitors to use
- Just haven't bothered to take it home
- Other: _____

 [Only answer this question if you answered 'Yes' to question '0003 ' /and/ if you answered 'Yes' to question '0061 ' /and/ if you have NOT answered 'Not applicable: I have never had a bike on campus' to question '0058 ']

Q0065: Thinking about the bike you leave on campus, are any of the following true for you?

	Yes	No
I plan to use it again at some point in the future.	<input type="radio"/>	<input type="radio"/>
I forgot where I last parked the bike.	<input type="radio"/>	<input type="radio"/>
The bike is broken or has a flat.	<input type="radio"/>	<input type="radio"/>
I stopped riding it after suffering an illness or injury.	<input type="radio"/>	<input type="radio"/>
I lost the key to my lock or my lock is stuck.	<input type="radio"/>	<input type="radio"/>

 [Only answer this question if you answered 'Yes' to question '0003 ' /and/ if you answered 'Yes' to question '0061 ' /and/ if you have NOT answered 'Not applicable: I have never had a bike on campus' to question '0058 ']

Q0066: If there was somewhere on campus you could bring your bike to donate it to a charity in its current condition -- or to be recycled -- would you consider doing so in the future?

- Very unlikely Somewhat unlikely Unsure Somewhat likely Very likely

 [Only answer this question if you answered 'Yes' to question '0003 ' /and/ if you answered 'Yes' to question '0061 ' /and/ if you have NOT answered 'Not applicable: I have never had a bike on campus' to question '0058 ']

Q0067: If there was someone you could call to take your bike away from campus for free, would you use that service at some point in the future?

- Very unlikely Somewhat unlikely Unsure Somewhat likely Very likely

Incidents

[Only answer this question if you answered 'Yes' to question '0003 ']

Q0068: For the next three questions, please consider all your regular travel between home and campus destinations, as well as between destinations on campus _within the last year_.

[Only answer this question if you answered 'Yes' to question '0003 ']

Q0069: While biking (to, from, or on campus), were you in a crash that damaged your bike or caused you personal injury?

- Yes
- No
- Not applicable: I have not biked there in the last year

[Only answer this question if you answered 'Yes' to question '0003 ']

Q0070: While walking (to, from, or on campus), did you experience a collision with a motor vehicle or bicycle that caused you personal injury?

- Yes
- No
- Not applicable: I have not walked there in the last year

[Only answer this question if you answered 'Yes' to question '0003 ']

Q0071: While traveling by car (to, from, or on campus) were you in a crash that damaged the car or caused you personal injury?

- Yes
- No
- Not applicable: I have not been in a car there in the last year

Your opinions about transportation

[Only answer this question if you answered 'Yes' to question '0003 ' /and/ if you have NOT answered 'I live on campus' to question '0004 ']

Q0072: How strongly do you agree with the following?

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
Getting between home and campus is a hassle for me.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I drive more than I need to.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I drive more than I want to.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel safe walking to and around campus.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel safe (or would feel safe) biking to and around campus.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Whether or not I do it, I like the idea of biking to campus.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I use the time I spend traveling between home and campus productively.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I generally enjoy the time I spend traveling between home and campus.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

[Only answer this question if you answered 'Yes' to question '0003 ' /and/ if you answered 'I live elsewhere in Davis' to question '0004 ' /and/ if you answered 'Carpool/vanpool (travel with others going to campus)' or 'Drive myself (travel alone)' or 'Get/give a ride (with others going elsewhere)' to question '0031 ']

Q0073: We understand that biking isn't a good option for everyone. In your case, what are the main reasons you don't bike to campus more often?

 [Only answer this question if you answered 'Yes' to question '0003 ' /and/ if you answered 'I live outside of Davis' to question '0004 ' /and/ if you answered 'Carpool/vanpool (travel with others going to campus)' or 'Drive myself (travel alone)' or 'Get/give a ride (with others going elsewhere)' to question '0031 ']

Q0074: We understand that public transportation isn't a good option for everyone. In your case, what are the main reasons you don't take public transportation (such as the bus or Amtrak) to campus more often

Transportation services

[Only answer this question if you answered 'Yes' to question '0003 ']

Q0075: Are you familiar with any of the following transportation services?

	It's new to me	I've heard of it, but never used it	I've used it
Discounted transit passes (TAPS transit pool program)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Carpool/vanpool program	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Emergency ride home service for carpool and transit/train users	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Free daily parking days for carpoolers, trainpoolers, and transitpoolers (24 per year)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Online ridematching (find a carpool partner) service	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Yolo TMA Commuter Club	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
www.sacregion511.org	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ten bike tire air stations around campus	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
UC Davis Bike Auction	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
TAPS motorist assistance program	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Bike lock-cutting service	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Comet in-vehicle parking meters	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Car sharing

[Only answer this question if you answered 'Yes' to question '0003 ']

Q0076: Some cities and campuses have car sharing programs, where for a reasonable fee that includes gas, insurance, and reserved parking, you can rent cars by the hour. Most services allow you to make last-minute reservations online or by phone, and to access cars wherever they are parked with a cardkey. Examples include services like Zipcar and City CarShare.

[Only answer this question if you answered 'Yes' to question '0003 ']

Q0077: If UC Davis were to partner to offer car sharing on campus, do you think you would use it?

Very unlikely Somewhat unlikely Unsure Somewhat likely Very likely

Bike sharing

[Only answer this question if you answered 'Yes' to question '0003 ']

Q0078: Imagine if there were self-service, hourly bike rentals, where you could check out a bike (using a credit card or smartcard) from designated bike racks ("docking stations") located around campus and in town. You could swipe your card, grab a bike, ride it as needed, and then drop it off at any of the other docking stations.

[Only answer this question if you answered 'Yes' to question '0003 ']

Q0079: Do you think you (or your visitors) would use this sort of service on campus?

Very unlikely Somewhat unlikely Unsure Somewhat likely Very likely

[Only answer this question if you answered 'Yes' to question '0003 ']

Q0080: Do you think you (or your visitors) would use this service to travel between the Davis Amtrak station and campus?

Very unlikely Somewhat unlikely Unsure Somewhat likely Very likely

[Only answer this question if you answered 'Yes' to question '0003 ' /and/ if you answered 'Yes' to question '0061 ']

Q0081: Do you think you might use this service instead of leaving a bike on campus overnight?

Very unlikely Somewhat unlikely Unsure Somewhat likely Very likely

[Only answer this question if you answered 'Yes' to question '0003 ' /and/ if you answered 'On the UCD campus' to question '0018 ']

Q0082: If you could use one of these bikes to get from a parking lot to your campus destination, would you consider parking farther away than you do now?

Very unlikely Somewhat unlikely Unsure Somewhat likely Very likely

About you

[Only answer this question if you answered 'Yes' to question '0003 ']

Q0083: Finally, this section asks a few questions about you. We use this information to help understand travel choices and how the people taking the survey might represent the UC Davis population as a whole. Your answers are confidential and will not be used for any other purpose.

[Only answer this question if you answered 'Yes' to question '0003 ']

Q0084: What is your gender?

- Male Female

[Only answer this question if you answered 'Yes' to question '0003 ' /and/ if you have NOT answered 'Student' to question '0001 ']

Q0085: How many years have you been at UC Davis?

- 0 (this is my first)
 1 year
 2 years
 3 years
 [... each year listed ...]
 18 years
 19 years
 20 years or more

[Only answer this question if you answered 'Yes' to question '0003 ']

Q0086: Which of the following do you own and use, at least on occasion? (Check all that apply.)

- Bike
 Car, truck, or other vehicle
 Cell phone
 iPod or other portable audio player
 Laptop

[Only answer this question if you answered 'Yes' to question '0003 ' /and/ if you answered 'I live outside of Davis' to question '0004 ']

Q0087: Your zip code:

[Only answer this question if you answered 'Yes' to question '0003 ' /and/ if you answered 'I live outside of Davis' or 'I live elsewhere in Davis' to question '0004 ']

Q0088: What is an intersection near your home? This will only be used to calculate the approximate distance you travel to campus. It will be kept confidential and will not be used in any other way.

Your street: _____

Nearest cross-street: _____

[Only answer this question if you answered 'Yes' to question '0003 ']

Q0089: How many people live in your household (including yourself)? Please answer for where you live locally, from where you commute to campus.

- | | |
|--|--|
| <input type="radio"/> 1 (I live alone) | <input type="radio"/> 7 people |
| <input type="radio"/> 2 people | <input type="radio"/> 8 people |
| <input type="radio"/> 3 people | <input type="radio"/> 9 people |
| <input type="radio"/> 4 people | <input type="radio"/> 10 or more people |
| <input type="radio"/> 5 people | <input type="radio"/> Not applicable -- I live in a dorm |
| <input type="radio"/> 6 people | |

[Only answer this question if you answered 'Yes' to question '0003 ' /and/ if you have NOT answered 'Not applicable -- I live in a dorm' to question '0089 ']

Q0090: How many people of each category are in your household (including yourself)?

Children, age under 6: _____

Teenagers, age 6-15: _____

Youth, age 16-17: _____

Total adults, age 18-65: _____

Elders, age 65 or older: _____

[Only answer this question if you answered 'Yes' to question '0003 ']

Q0091: What year were you born?

- 1930
- 1931
- 1932
- 1933
- [... all years listed between...]
- 1991
- 1992

[Only answer this question if you answered 'Yes' to question '0003 ' /and/ if you have NOT answered 'Student' to question '0001 ']

Q0092: What is your highest level of education?

- No formal education
- Some grade school or high school
- High school diploma or equivalent
- Some college
- Associate degree or technical school certificates
- Bachelors' degree
- Some graduate school
- Graduate degrees

[Only answer this question if you answered 'Yes' to question '0003 ' /and/ if you have NOT answered 'Student' to question '0001 ']

Q0093: What is the approximate total annual combined income of all the working adults in your household?

- \$0 - \$19,999
- \$20,000 - \$39,999
- \$40,000 - \$59,999
- \$60,000 - \$79,999
- \$80,000 - \$99,999
- \$100,000 - \$119,999
- \$120,000 - \$139,999
- \$140,000 - \$159,999
- \$160,000 - \$179,999
- \$180,000 - \$199,999
- Greater than \$200,000

Thank you

[Only answer this question if you answered 'Yes' to question '0003 ']

Q0094: Thank you for taking the survey!

[Only answer this question if you answered 'No' to question '0003 ']

Q0095: We only need answers from those commuting regularly to the Davis campus at this time, but thank you for your willingness to participate! As a token of our appreciation, would you like to enter in our drawing to win an 8GB iPod Nano?

Yes

[Only answer this question if you answered 'No' to question '0003 ' /and/ if you answered 'Yes' to question '0095 ']

Q0096: Please enter your UC Davis email address.* This information will not be shared with others and will not be used for any purpose other than to contact you if you win the drawing.

Email: _____

Verify email: _____

[Only answer this question if you answered 'Yes' to question '0003 ']

Q0097: So that we can keep track of who has completed the survey, please enter your UC Davis email address.* This information will not be shared with others and will not be used for any other purpose, aside from the options you select below.

Email: _____

Verify email: _____

[Only answer this question if you answered 'Yes' to question '0003 ']

Q0098: As a token of our appreciation, your name will be entered in a drawing to win an 8GB iPod Nano. If you do NOT want to be entered in the drawing, check here:

No, thanks

[Only answer this question if you answered 'Yes' to question '0003 ']

Q0099: Optional: Would you like to receive a summary of the survey results?

Yes

[Only answer this question if you answered 'Yes' to question '0003 ']

Q0100: Optional: Would you be willing to be contacted for participation in follow-up research?

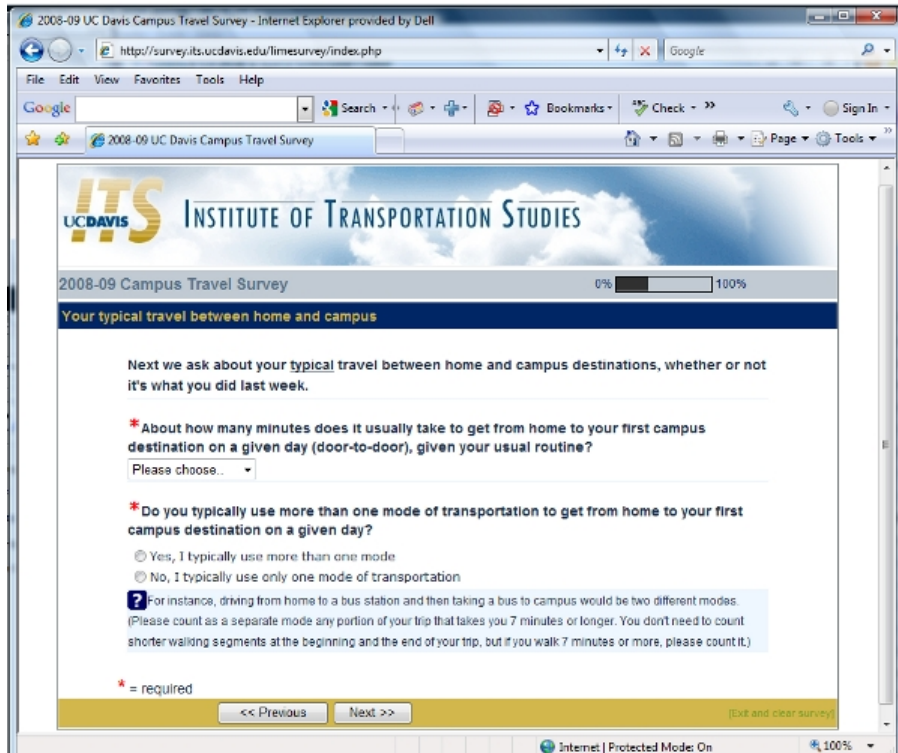
Yes

[Only answer this question if you answered 'Yes' to question '0003 ']

Q0101: Optional: Is there anything else you would like to tell us about traveling to campus or about this survey?

Thank you for completing this survey.

Figure 14. Sample screenshot of a page from the online survey



Appendix B: Comparison of mode choice questions in 07-08 versus 08-09 surveys

	2007-08 Survey instrument	2008-09 Survey instrument
Questions on which days traveled	n/a	<p>Did you travel to campus destinations on any of the seven days last week (Mon-Sun, Nov 3 - 9)?</p> <ul style="list-style-type: none"> • Yes • No <p>Which days of the week did you travel on campus?</p> <ul style="list-style-type: none"> • Monday (Nov 3) • Tuesday (Nov 4) • Wednesday (Nov 5) • Thursday (Nov 6) • Friday (Nov 7) • Saturday (Nov 8) • Sunday (Nov 9)
Question wording for travel mode	Please check your method of travel TO work for each day worked/went on campus: (NOTE: Make sure you have FIVE check marks, one for each day of the week.)	<p>What was your primary means of transportation from home to your first campus destination each of these days?</p> <p>If you used more than one means of transportation on a given day, indicate whichever one you used to travel the greatest amount of distance.</p>
Answer options for travel mode	<ul style="list-style-type: none"> • Did not travel this day. • Drove by myself (arrived/departed alone) • Took a bus • Rode a bike • Walked (7 minutes or more) • Carpooled or Vanpooled (arrived/departed with others) • Other • USED MORE THAN ONE of the methods listed above 	<ul style="list-style-type: none"> • Biked • Walked • Skated • Drove myself (arrived alone) • Carpooled or vanpooled (arrived with others) • Got a ride (dropped off by someone going elsewhere) • Bus • Train or light rail
Follow-up question about using multiple modes	You indicated that you use more than one form of travel to get to campus. Please briefly explain how you commute to campus. Please write your answer here:	n/a
Question wording regarding reasons not traveling	If you did not travel to work on any day, please indicate the reason below for each day you did not travel to work.	What was the main reason that you did not travel on campus this day last week?
Answer options for reasons not traveling	<ul style="list-style-type: none"> • Sick • Vacation • Telecommuted • Regularly scheduled day off • Day off as part of 4/40 compressed work week • Day off as part of 9/80 compressed work week • Day off as part of 3/36 compressed work week • Other (e.g. jury duty) 	<ul style="list-style-type: none"> • Regularly scheduled day off (no work or classes) • Working from home or telecommuting • Traveling for work (meetings, conference, field work) • Sick • Vacation • Day off as part of a 3/36 compressed work week • Day off as part of a 4/40 compressed work week • Day off as part of a 9/80 compressed work week • Other (e.g. jury duty)

Appendix C: Text of the recruitment emails

Initial recruitment email:

Dear UC Davis Student [Employee],

You have been selected as part of a small group of students, faculty, and staff to participate in the 2008-2009 UC Davis Campus Travel Survey. The survey provides campus planners with valuable feedback on how people get to campus and their opinions about campus transportation policies. It should take less than 15 minutes to complete. As a token of our appreciation, we're offering entry into a drawing for an 8GB iPod Nano for those completing the survey.

To start the survey, please click on the link below:

<http://survey.its.ucdavis.edu/limesurvey/index.php?sid=16427>

Thank you for your participation!

Best regards,

Kristin Lovejoy, Graduate Student, Institute of Transportation Studies

Susan Handy, Professor, Institute of Transportation Studies

Cliff Contreras, Director, Transportation and Parking Services

Reminder recruitment email

Dear UC Davis Student [Employee],

Last week we invited you to participate in the 2008-2009 Campus Travel Survey. I am writing to encourage you to try the survey now if you have not already done so. If you have already completed it, thank you! And we apologize if you tried it but found the website running too slowly to finish. We are now staggering our email invitations to ensure that the website is functioning more smoothly, and we hope that you will try it again.

The survey should take less than 15 minutes to complete. As a token of our appreciation, we're offering entry into a drawing for an 8GB iPod Nano for those completing it.

To start, please click on the link below:

<http://survey.its.ucdavis.edu/>

Thanks again for your participation. Your feedback is valuable to campus planners.

Best regards,

Kristin Lovejoy, Graduate Student, Institute of Transportation Studies

Susan Handy, Professor, Institute of Transportation Studies

Cliff Contreras, Director, Transportation and Parking Services

Appendix D: Calculation of Average Vehicle Ridership (AVR)

AVR (average vehicle ridership) is a ratio of the number of person-arrivals to private-vehicle-arrivals. If everyone drove by themselves to campus, the campus AVR would be 1.0. Higher AVR values (greater than 1.0) indicate more carpooling and/or use of alternative modes of transportation.

To compare AVR statistics on the Davis campus with other UC campuses, we calculate AVR using a standard formula developed by the South Coast Air Quality Management District (AQMD) in "Rule

2202 – On Road Motor Vehicle Mitigation Options.”¹³ The AQMD formula excludes weekend travel (considering Monday through Friday only) and excludes on-campus residents (considering travel among off-campus residents only). It includes adjustments for vehicle occupancy and the use of zero-emissions vehicles (ZEV).

In particular, we use the following formula:

$$AVR = \frac{\text{Total weekly arrivals}}{\text{Weekly vehicle arrivals}} = \frac{(\text{Arrivals by all modes}) + (\text{Employee telecommuting days}) + (\text{CWW days})}{(\text{Drive alone arrivals}) + (\text{Fractional carpool arrivals})}$$

with:

Arrivals by all modes = a count of all respondents arriving by bus, driving, carpooling, getting a ride, walking, biking, skating, and riding transit on Monday, plus the same for Tuesday, Wednesday, etc. through Friday (using question *Q0011* in the 2008-09 survey).

Employee telecommuting days = a count of respondents telecommuting on Monday, plus those doing so on Tuesday, etc. through Friday. These are based on responses to questions *Q0023* through *Q0027* for any respondents who traveled some days and telecommuted other days. But for respondents who indicated no travel during any of the eight days of the the reference week (in *Q0008*) and then indicated the reason for no travel was telecommuting (in *Q0013*), we assume the respondent telecommuted all five days of the reference week. Students are excluded (using *Q0002*).

Employee CWW days = a count of respondents reporting that they did not travel on Monday because they had a CWW (compressed work week) day off, plus those who did so for Tuesday, Wednesday, etc. through Friday (using *Q0023* through *Q0027*). Again, students are excluded (using *Q0002*).

Drive-alone arrivals = a count of respondents arriving by driving alone on Monday, plus those doing so on Tuesday, Wednesday, etc. through Friday (using *Q0011*). As an adjustment for the use of ZEV vehicles, we exclude from the count any arrivals by a respondent who has indicated using an electric vehicle for their travel during the reference week (in *Q0015*).

Fractional carpool arrivals = A count of the fractions of vehicle-arrivals accounted for those arriving in carpools (or getting rides) for each day Monday through Friday. In particular, for each day a respondent carpools (or gets a ride, using *Q0011*) we add to the arrival count a fraction equal to one divided by the total number of people in the carpool (using *Q0016*) or the number of passengers dropped off by the driver (using *Q0017*). We exclude from the count any arrivals by a respondent who has indicated using an electric vehicle (in *Q0015*).

Excluded from all counts is anyone who does not travel to campus regularly (based on *Q0003*, if not already screened from the sample frame).

We calculate AVR both excluding and including on-campus residents. (The former is used by the AQMD.) We also calculate a measure of AVR for weekend trips to campus, which is the same as the

¹³ As of December 1, 2008, this rule is available online (at http://www.aqmd.gov/trans/doc/regform/all_registration.pdf).

weekday AVR except for arrivals on Saturday and Sunday only, and excluding the telecommuting and CCW days, which were not measured for weekends.

Comparing AVR in 2008-09 to that in 2007-08

Differences in the treatment of the mode categories in the 2008-09 versus 2007-08 surveys allow for substantial difference in the measurement of AVR across years, especially the measurement of multimodal trips (see Appendix B). For the purposes of calculating AVR, the numbers that matter most are an estimate of the overall number of people traveling to campus and the overall number of vehicle trips to campus. A question with the 2007-08 survey is how/whether to categorize any of the multimodal travelers as vehicle-users. In the weighted (not expanded) sample, 446 of 4180 respondents (10.7%) reported using multiple modes on at least one day during the reference week (questions 3.0.1.21 through 3.0.1.25 on the 07-08 survey). On average, 5.5 percent of the respondents were using multiple modes on any one day. In Congleton (2009), the AVR calculations do not include any of the multimodal or “other” trips as vehicle trips, increasing the estimated AVR.

To make the statistics more comparable across years, we attempted to categorize as many of the multimodal trips (responses questions 3.0.1.21 through 3.0.1.25) as a specific individual mode based on the write-in responses to question 3.0.1.4. In particular, we attempted to identify which mode was used most or for the greatest distance based on the respondent's description, and then recoded any 7's (“more than one of these”) in questions 3.0.1.21 through 3.0.1.25 to that other mode. These recodes resulted in a reduction in the number of one-way person-trips to campus that were categorized as multimodal from 1,141 to 441, with corresponding increases in the number of trips coded as biking, walking, driving, carpooling, and other, as shown in the table below.

Table 50. Number of one-way person trips over the five travel days by mode, 2007-08

Mode used	Original	New	Change
0 Did not travel this day	1,443	1,443	0
1 Drove by myself (arrived/departed alone)	5,445	5,639	194
2 Took a bus	3,478	3,717	239
3 Rode a bike	7,254	7,343	89
4 Walked (7 minutes or more)	948	959	11
5 Carpooled or Vanpooled (arrived/departed with others)	1,020	1,075	55
6 Other	170	282	112
7 Used more than one methods	1,141	441	-700
Total (n=4180 respondents x 5 days = 20,900)	20,900	20,900	0

Results are based on questions 3.0.1.21 through 3.0.1.25 of the 2007-08 Campus Travel Survey. Data are weighted by role so that the distribution of roles in the sample matches that of the campus population, as shown in Table 51.

We then used the recoded data to recalculate AVR for 2007-08 (as well as to recalculate mode splits, reported elsewhere) using the same method as above. As above, we calculate AVR both excluding and including on-campus residents, drawing inputs for the AVR formula from the 2007-08 survey as follows:

Arrivals by all modes = a count of all respondents arriving by driving, taking the bus, riding a bike, walking, carpooling, “other,” and using “more than one” mode on Monday, plus the

same for Tuesday, Wednesday, etc. through Friday (using the recoded responses to questions 3.0.1.21 through 3.0.1.25).

Employee telecommuting days = a count of respondents telecommuting on Monday, plus those doing so on Tuesday, etc. through Friday (based on responses to questions 3.0.1.31 through 3.0.1.35).

Employee CWW days = a count of respondents reporting that they did not travel on Monday because they had a CWW (compressed work week) day off, plus those who did so for Tuesday, Wednesday, etc. through Friday (again based on responses to questions 3.0.1.31 through 3.0.1.35).

Drive-alone arrivals = a count of respondents arriving by driving alone on Monday, plus those doing so on Tuesday, Wednesday, etc. through Friday (using questions 3.0.1.21 through 3.0.1.25). As an adjustment for the use of ZEV vehicles, we exclude from the count any arrivals by a respondent who has indicated using an electric vehicle for their travel during the reference week (in question 3.1.3.1).

Fractional carpool arrivals = A count of the fractions of vehicle-arrivals accounted for those arriving in carpools for each day Monday through Friday. In particular, for each day a respondent carpools (based on questions 3.0.1.21 through 3.0.1.25) we add to the arrival count a fraction equal to one divided by the total number of people in the carpool (using responses to question 3.1.2.1). We exclude from the count any arrivals by a respondent who has indicated using an electric vehicle (in question 3.1.3.1).

Weight factors used for AVR calculations

The weights used to estimate AVR using the 2008-09 data are those based on the number of valid responses to question *Q0008*, shown in Table 6. The following weights and expansion factors were used for the estimation of mode split and AVR statistics using the 2007-08 data.

Table 51. Weight factors by role for 2007-08 data

Role group (<i>i</i>)	Population (<i>N</i>)	Valid responses (<i>n</i>)	Weight factor (N_i/N)/(n_i/n)	Expansion factor (N_i / n_i)	Weighted sample size
Freshmen	4,527	437	1.0668	10.3593	466
Sophomores	4,891	457	1.1021	10.7024	504
Juniors	5,703	425	1.3818	13.4188	587
Seniors	8,547	382	2.3040	22.3743	880
Masters	1,873	311	0.6202	6.0225	193
PhDs	3,660	454	0.8302	8.0617	377
Faculty	2,073	479	0.4457	4.3278	213
Staff	8,888	1,164	0.7863	7.6357	915
Administration	430	71	0.6237	6.0563	44
Overall	40,592	4,180	1.0000	9.7110	4,180

Appendix E: Geocoding and network distances

We used the ESRI Streetmap USA dataset to do all of the geocoding and network tracing. It is based on the TIGER/Line 2000 streets dataset produced by the Census Bureau, and has been enhanced by ESRI and Tele Atlas. The Streetmap dataset was released by ESRI in 2006, but it only represents the ground condition as of 2000. As a result, parts of some rapidly developing areas such as Natomas, West Sacramento, and Elk Grove are not included. This caused a problem for some of the geocoding, but in all of the areas, there were at least some roads present before the most recent development occurred. If the exact street was not available, then we geocoded the point to the nearest pre-existing road. In all cases, the differences were minor and should be negligible.

Geocoding residential locations

We used address information to geocode points to the ESRI Streetmap USA dataset. First, we imported all of the data into Microsoft Access, and used a series of queries to filter out empty records, divide the data into separate tables for each subcategory (Campus, Davis, Outside Davis, and Two Locations), and concatenate the street names into a single field. This allowed us to input the data into an appropriate address locator that would be able to automatically geocode as many addresses as possible.

Inputting the data directly into an address locator produced the results shown in Table 52. Because there was the potential for a small percentage of addresses to be matched incorrectly, conducting the automatic geocoding, we also manually verified that the match address was the same as the input address. We geocoded all unmatched addresses by manually placing points in the correct locations, or by modifying the input addresses so that they matched correctly using an automatic address locator.

Table 52. Geocoding results using automatic address locator

Category	Matched	Unmatched
On campus	n/a	
Off campus within Davis	76.2%	23.8%
Outside Davis	57.6%	42.4%
Two locations		
First location	66.7%	33.3%
Second location	52.0%	48.0%
Overall	70.7%	29.3%
Unweighted sample	2,123	879

Network distance

The network tracing was done using ArcGIS Network Analyst on the ESRI Streetmap USA dataset (the same set used to geocode the residential locations). All distances were calculated from the residential location points to a point located on the UC Davis campus at the corner of Hutchison Drive and California Avenue, near the Silo. The network tracing

calculation was done to optimize for the fastest travel times (based on assumptions about the expected speed of travel on each facility type), which was deemed more realistic routes than optimizing for distance, because it produces routes that favor major roads and highways where possible. While this is especially appropriate for those traveling by car, manual inspection of alternative routes seemed that they were also more realistic for bike and walk trips, where differences existed. Note that in this analysis, we used the street network, which was *not* augmented to include additional bike- and pedestrian-only links, which are especially prevalent in Davis.

Because the 07-08 survey employed a different method both to collect data on the respondents' residential locations (allowing respondents to click on a map versus typing cross streets into a text field); to geocode points; and to calculate network distances, the estimated distances and calculations based on them (miles traveled and emissions) are not comparable across the two survey years.

Appendix F: Fuel energy assumptions used for calculation of CO₂ emissions

We calculate pounds equivalent of carbon per gallon of fuel = mass of carbon per unit energy × energy per gallon of fuel × oxidation rate × molecular weight of carbon, as done by the Environmental Protection Agency (see <http://www.epa.gov/otaq/climate/420f05001.htm#carbon>). We assume inputs for this formula as shown in Table 53.

Table 53. Fuel energy assumptions used for calculating carbon emissions

Item	Value	Source
Mass of carbon per unit energy for diesel fuel	19.95 Tg Carbon / QBtu	U.S. Environmental Protection Agency, <i>2009 U.S. Greenhouse Gas Inventory Report</i> , Table A-39 (Distillate Fuel), available online: http://epa.gov/climatechange/emissions/usinventoryreport.html
Mass of carbon per unit energy for CNG	14.47 Tg Carbon / QBtu	U.S. Environmental Protection Agency, <i>2009 U.S. Greenhouse Gas Inventory Report</i> , Table A-31 (Natural Gas), available online: http://epa.gov/climatechange/emissions/usinventoryreport.html
Energy per gallon diesel	138,691 Btu/gallon	U.S. Department of Energy, Energy Information Administration, online Energy Calculator, available online: http://www.eia.doe.gov/kids/energyfacts/science/energy_calculator.html
Energy per cubic ft CNG	1,028 Btu/ cubic foot	U.S. Department of Energy, Energy Information Administration, online Energy Calculator, available online: http://www.eia.doe.gov/kids/energyfacts/science/energy_calculator.html
Oxidation rate	0.99	U.S. Environmental Protection Agency, Emission Facts (EPA420-F-05-001 February 2005), available online: http://www.epa.gov/otaq/climate/420f05001.htm#carbon
Molecular weight of carbon	44/12 ≈ 3.667	U.S. Environmental Protection Agency, Emission Facts (EPA420-F-05-001 February 2005), available online: http://www.epa.gov/otaq/climate/420f05001.htm#carbon