

SACRAMENTO AREA TRAVEL SURVEY: BEFORE BIKE SHARE

August 2017

A Research Report from the National Center
for Sustainable Transportation

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National Center
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Sacramento Area Travel Survey: Before Bike Share

EXECUTIVE SUMMARY

Cities throughout the world have implemented bike-share systems as a strategy for expanding mobility options and improving the sustainability of the urban transportation system. These systems have attracted substantial ridership, even in the U.S., but the impact on overall levels of bicycling and other modes of travel have not been well documented. The purpose of this project is to document the impacts of a bike-share system to be launched by the Sacramento Area Council of Governments (SACOG) in 2018. The project uses a before-and-after methodology to directly measure the impact of the bike-share system on levels of bicycling, transit use, and vehicle-miles of travel as well as attitudes towards bicycling in the area served by the system. This report summarizes the method and results for the first phase of the study, the “before” survey implemented in April 2016.

Introduction

Cities throughout the world have implemented bike-share systems as a strategy for expanding mobility options and improving the sustainability of the urban transportation system (DeMaio, 2009; Shaheen et al., 2010; Fishman et al., 2013). These systems have attracted substantial ridership, even in the U.S., but the impact on overall levels of bicycling and other modes of travel have not been well documented (Schoner et al., 2015; Castillo-Manzano et al., 2015).

The purpose of this project is to document the impacts of a bike-share system to be launched in by the Sacramento Area Council of Governments (SACOG) starting in portions of the city of Sacramento and in the cities of West Sacramento and Davis. The project uses a before-and-after methodology to directly measure the impact of the bike-share system on levels of bicycling, transit use, and vehicle-miles of travel as well as attitudes towards bicycling in the area served by the system. This report summarizes the method and results for the first phase of the study, the “before” survey implemented in April 2016.

Method

The project uses a before-and-after methodology to directly measure the impact of the bike-share system. We conducted the “before” survey in April 2016 and expect to conduct the “after” survey some months after the launch of the full-scale bike share system in 2018.

The initial sample for the “before” survey comprised 14,000 addresses in the Sacramento area. The cities of Sacramento, West Sacramento, and Davis provided databases of residential addresses. For West Sacramento and Davis, the database included all residential addresses; we used Microsoft Excel’s random number generator to randomly select 5,000 addresses in Davis and 2,000 addresses in West Sacramento. In Sacramento, we focused on the central city¹, where the bike share system is likely to be first implemented, and the South Natomas neighborhood², where the bike share system will not initially be implemented. From the database of addresses for these areas, we randomly selected 5,000 and 2,000 addresses, respectively. Residents of South Natomas thus serve as a control group for the analysis, as do residents of areas of Davis and West Sacramento that are not served by the bike share system.

We sent a recruitment letter to the initial sample of 14,000 addresses in April 2017. The recruitment letter (see Appendix A) invited residents to participate in an on-line survey and provided the URL for the survey site. We offered potential participants the opportunity to be entered into a cash prize drawing for ten \$100 gift cards if they completed the survey by April 30, 2016. The recruitment letter stated that only residents over the age of 18 could participate in our study, and it asked potential participants unwilling or unable to complete the online survey to contact us to request a physical copy of the survey in the mail with a postage-paid

¹ Defined by zip codes 95811, 95814, 95816, 95817, 95818, 95819, 95820, 95822, 95826.

² Defined by zip codes 95833 and 95834.

return envelope. We sent reminder postcards (see Appendix B) one week following the initial recruitment letters and extended the deadline for entering into the drawing to May 12, 2016. After accounting for undeliverable addresses (based on the number of returned letters), we achieved a response rates of 11.5% for Sacramento, 8% for West Sacramento, and 20% for Davis, for an overall rate of 14%.

The online survey was programmed using Qualtrics software. A small number of physical copies of the survey (see Appendix C) were sent out and returned in the mail; we entered these into the online survey manually. We exported the survey data from Qualtrics as a .csv file and imported this file into SPSS for analysis. We excluded records for which Qualtrics recorded progress of less than 50%.

Results

As the research question – the impact of the bike share system – cannot be answered until the “after” survey is completed, this report presents basic descriptive statistics from the “before” survey. We present results by city and overall for each question on the survey.

Access to different modes of travel varies across the three cities (Table 1). Overall, less than 7% of respondents do not own at least one vehicle. Davis respondents are the most likely to not own a vehicle, not surprising given the large student population and the high level of bicycling in the city. Sacramento respondents are more likely to own just one vehicle than respondents of the other two cities. This result likely reflects the focus on central Sacramento, where the bike share system will first be implemented; a high proportion of housing in this area is multifamily. West Sacramento respondents are the most likely to own three or more vehicles, consistent with the suburban character of the city. The vast majority of respondents has access to transit, with less than 8% reporting that they do not have bus or train service within a five minute walk from their home. Respondents from West Sacramento report lower access to bus or train service than respondents of the other two cities.

Access to bicycles is less pervasive, with about half of respondents reporting that they always or at least sometimes have access to a bike, and about half reporting that they rarely or never have access to a bike (Table 1). Not surprisingly, Davis respondents have higher access to bikes, with 57% reporting that they always, mostly, or sometimes have access to a bike. About 10% of respondents report having a physical or other health condition that limits their ability to walk (9%) or bicycle (12%); the differences between cities are slight (Table 2). Confidence in bicycling ability differs more significantly across cities, with three-quarters of Davis respondents saying that they are very confident riding a bike, but only two-thirds of residents of Sacramento and West Sacramento feeling equally confident. Because only 50% of respondents report access to a bicycle, a substantial share of respondents who are confident bicycling must not have access to a bicycle, suggesting a potential market for the bike share system.

Travel patterns reflect these differences in access to modes. Overall, respondents report driving 82 miles in a typical week, on average, with Davis respondents reporting the fewest miles and West Sacramento respondents reporting the most miles (Table 3).

Other measures of mode use show the dominance of car travel across all cities, though greater reliance on bicycling in Davis. On average, respondents report driving or riding in a car more than 5 out of the last 7 days, ranging from 4.8 days for Davis respondents to 5.8 days for West Sacramento respondents (Table 4). Davis respondents rode on a bus or train more often on average than respondents of the other cities, though the average was less than 1 day out of 7. West Sacramento respondents are less likely to have walked outdoors for more than 10 minutes at a time than respondents from the other two cities, reporting 3.8 days versus 4.4 days on average respectively. Davis respondents reported bicycling almost 3 days out of 7 on average, over twice the number of days as in other cities. In Davis, bicycling for transportation – to get to work or another destination – is twice as frequent as bicycling for recreation, on average, whereas in other cities the frequencies are about the same.

Table 1. Access to Modes

	Sacramento	West Sacramento	Davis	Total
<i>Percent owning cars (n=1884)</i>				
0 cars	5.1%	5.8%	8.1%	6.7%
1 car	44.1%	36.1%	37.6%	40.2%
2 car	38.6%	36.1%	37.2%	37.7%
3 or more cars	12.1%	21.9%	17.0%	15.4%
<i>Percent with bus access within 5 minute walk (n=1503)</i>				
No	8.1%	13.7%	6.3%	7.8%
Yes	86.4%	71.9%	89.4%	86.5%
<i>Percent with bicycle access (n = 1003)</i>				
always	37.7%	41.3%	49.8%	43.0%
most of the time	3.9%	4.8%	3.9%	4.0%
sometimes	2.6%	3.8%	3.7%	3.2%
rarely	3.3%	5.8%	2.7%	3.3%
never	52.5%	44.2%	40.0%	46.6%

Table 2. Active Travel Ability

	Sacramento	West Sacramento	Davis	Total	n
<i>Physical disability or health condition</i>					
Preventing walking	7.2%	7.9%	10.0%	8.6%	1876
Preventing biking	10.6%	12.3%	12.9%	11.9%	1880
<i>Ability to ride a bike</i>					
Can't ride	1.6%	1.5%	1.0%	1.3%	1654
Not confident	11.0%	7.4%	6.5%	8.5%	
Somewhat confident	21.7%	24.4%	18.6%	20.4%	
Very confident	65.7%	66.7%	74.0%	69.9%	

Table 3. Car availability and use

	Sacramento	West Sacramento	Davis	Total	n
Miles driven in a typical week	87	105	74	82	1810
Number of motor vehicles in household	1.6	1.9	1.7	1.7	1884

Table 4. Average Number of Days Mode Used in Last 7 Days

	Sacramento	West Sacramento	Davis	Total	n
Drive or ride in car	5.5	5.8	4.8	5.2	1875
Ride on bus or train	0.6	0.4	0.9	0.7	1696
Walk outdoors for more than 10 minutes at a time	4.4	3.8	4.4	4.3	1837
Bicycle for any purpose	1.1	0.9	2.3	1.7	1758
Bicycle to or from transit	0.1	0.1	0.2	0.1	1685
Bicycle to or from work or school	0.5	0.3	1.4	1.0	1725
Bicycle to somewhere else	0.6	0.4	1.2	0.9	1735
Bicycle for exercise or recreation	0.5	0.5	0.5	0.5	1725

The survey asked a similar question about the frequency of mode use for a typical week, which may differ from mode use in the previous 7 days owing to weather patterns, holidays, vacations, or unusual events (Table 5). As in the question about mode use in the previous week, driving or riding as a passenger dominates over other modes in all cities but is highest in West Sacramento. The average number of days walking is lowest in West Sacramento, while the number of days using public transit and bicycling are highest and the number of days driving are lowest in Davis. Davis respondents also report the highest frequency of riding a bicycle in general (Table 6), with over one-quarter reporting that they ride every day.

Table 5. Average Number of Days Using Mode in Typical Week

	Sacramento	West Sacramento	Davis	Total	n
Walking more than 10 minutes	1.4	0.9	1.4	1.4	1378
Bicycling	0.7	0.3	2.0	1.3	1377
Taking public transit	0.5	0.4	0.9	0.7	1356
Driving yourself	3.9	4.7	2.7	3.3	1432
Riding as a passenger	0.5	0.6	0.6	0.6	1358

Use of car sharing and ride sharing is relatively similar across cities, with ride-sharing use far more common than car-sharing use (Table 6). Overall, 85% of respondents have never used a car-sharing service such as Zipcar, while only 11% of respondents have never used a ride-sharing service such as Lyft, though another 52% report not having used a ride-sharing service in the last year. Davis respondents report higher frequency of use of car-sharing services than respondents from other cities, not surprising given lower levels of car ownership and the large student population. Sacramento respondents are the most likely to say that they use ride-sharing services at least a few times per month, but they are also the most likely to say that they have never used a ride-sharing service. This bifurcated result may reflect the two areas chosen for the survey, the central area where the initial bike-sharing system will be implemented and a more suburban area that is not slated for bike sharing. The most common purpose for using car-sharing was for commuting (42%; results not shown) followed by recreation (27%), and errands or picking up friends (11% each). The most common purpose for using ride-sharing was getting to or from a bar or restaurant (77%), with trips to the airport far behind (10%).

Table 6. Frequency of Mode Use

	Sacramento	West Sacramento	Davis	Total	n
<i>Bicycle</i>					
Every day	8.9%	4.5%	26.7%	17.5%	1887
Few times per week	16.7%	16.1%	20.7%	18.7%	
Few times per month	17.8%	17.4%	14.7%	16.2%	
Few times per year	16.4%	17.4%	11.9%	14.3%	
Not used last year	16.0%	16.1%	12.5%	14.3%	
Never	24.2%	28.4%	13.4%	19.1%	
<i>Car sharing (Zipcar, etc.)</i>					
Every day	0.1%	0.0%	0.0%	0.1%	1886
Few times per week	0.9%	0.0%	0.2%	0.5%	
Few times per month	1.7%	0.6%	1.9%	1.7%	
Few times per year	3.6%	2.6%	5.4%	4.4%	
Not used last year	9.2%	7.1%	8.9%	8.9%	
Never	84.6%	89.7%	83.6%	84.5%	
<i>Ride sharing (Lyft, Uber, etc.)</i>					
Every day	0.3%	0.0%	0.0%	0.1%	1883
Few times per week	5.9%	2.6%	1.3%	3.3%	
Few times per month	29.2%	25.2%	27.0%	27.8%	
Few times per year	5.6%	4.5%	5.1%	5.3%	
Not used last year	42.7%	56.8%	59.7%	52.4%	
Never	16.3%	11.0%	6.9%	11.2%	

The usual mode used to reach certain destinations shows interesting differences both across destinations and across cities (Table 7). Over 90% of West Sacramento respondents usually drive to work, in comparison to only 57% of Davis respondents. Nearly 30% of Davis respondents usually bicycle to work, over three times the share of Sacramento respondents. This pattern is even more skewed for school trips, with just under one third of Davis respondents reporting that they usually drive to school and 43% reporting that they usually bike.³ The highest rate of driving is for medical appointments (85% overall), followed by trips to the grocery store (79%) and visiting friends or family (74%), with a similar ordering of destinations across the three cities. Davis has the lowest rates of driving and the highest rates of biking highest for all types of destinations, while West Sacramento has the highest rates of driving and the lowest rates of biking for all types of destinations.

Attitudes towards and perceptions about travel modes are largely consistent with these patterns, though they generally differ less across cities than does the use of travel modes (Table 8). West Sacramento respondents are the most likely to agree (somewhat or strongly) that they like driving a car (72%) while Davis respondents are the least likely (64%). Davis respondents are the most likely to say that they like riding a bike (72%) and West Sacramento respondents the least likely (64%). Respondents across all cities are far less likely to say that they like using public transit (36%) than they are to say that they like driving (66%) or riding a bike (68%). Respondents generally feel a strong need for their car, whether to do things they like to do or to carry shopping or children (78% and 74%, respectively), even in Davis. On the other hand, over half of respondents say that they try to limit their driving as much as possible (53%). Only about a quarter of respondents across all cities report feeling that travel time is generally wasted time.

Perceptions of the bicycling environment differ more significantly across cities (Table 8). Davis respondents are far more likely to agree that there are good bicycle lanes and paths in the areas they need to go (78% compared to 39% and 38% for Sacramento and West Sacramento, respectively). Similarly, Davis respondents are far more likely to agree that they feel comfortable bicycling the areas they need to go and that they know how to get around by bicycle in the areas they need to go. Davis respondents are also far more likely to say that many friends or family or neighbors regularly bike and that bicycling is a normal mode of transportation for adults in the community. However, Davis respondents are about equally likely as respondents from other cities to report that bicyclists appear to spend a lot of money on their bicycles and accessories and that bicyclists appear to have little regard for their personal safety. A small minority of respondents say that bicyclists look like they are too poor to own a car, though the share is substantially higher in West Sacramento (19%) than in Sacramento (9%) or Davis (4%).

³ The question asked about the usual mode to “your school.” Given that we asked potential participants to complete the survey only if they were at least 18 years old, the results should mostly reflect travel to colleges or universities. It is possible, however, that parents responded to this question for their children’s trips to elementary, junior high, or high school or for their trip to escort their children to their school.

Table 7. Usual Mode by Destination

	Sacramento	West Sacramento	Davis	Total	n
<i>Work</i>					
Car	72.9%	91.8%	57.0%	66.9%	1319
Bike	9.4%	3.6%	29.2%	18.3%	
Transit	7.0%	3.6%	7.5%	7.0%	
Walk	10.6%	0.9%	6.2%	7.7%	
<i>School</i>					
Car	64.5%	83.3%	32.3%	45.3%	530
Bike	7.8%	3.3%	43.1%	29.8%	
Transit	10.2%	3.3%	20.4%	16.2%	
Walk	17.5%	10.0%	4.2%	8.7%	
<i>Grocery store</i>					
Car	81.3%	89.6%	75.3%	79.0%	1866
Bike	4.8%	2.6%	9.6%	7.0%	
Transit	1.0%	3.2%	1.6%	1.5%	
Walk	12.9%	4.5%	13.4%	12.5%	
<i>Bank</i>					
Car	72.2%	87.4%	65.7%	70.2%	1684
Bike	6.6%	1.4%	22.1%	13.9%	
Transit	0.7%	3.5%	2.7%	2.0%	
Walk	20.5%	7.7%	9.4%	13.9%	
<i>Restaurant</i>					
Car	66.5%	90.8%	70.0%	70.2%	1785
Bike	6.2%	2.8%	16.2%	10.9%	
Transit	1.7%	1.4%	2.0%	1.8%	
Walk	25.6%	4.9%	11.8%	17.1%	
<i>Visiting friend or family</i>					
Car	78.9%	89.9%	67.9%	74.3%	1793
Bike	5.5%	2.7%	17.8%	11.4%	
Transit	1.3%	1.4%	2.2%	1.8%	
Walk	14.4%	6.1%	12.1%	12.5%	
<i>Medical appointment</i>					
Car	88.8%	94.4%	80.2%	85.0%	1736
Bike	3.7%	0.0%	13.0%	8.0%	
Transit	2.7%	4.2%	4.3%	3.6%	
Walk	4.8%	1.4%	2.5%	3.4%	

Table 8. Transportation-related attitudes - percent somewhat or strongly agreeing

	West				n
	Sacramento	Sacramento	Davis	Total	
I like driving a car	66.6%	72.5%	63.9%	65.7%	1876
I like using public transit	32.1%	25.2%	40.3%	35.6%	1874
I like riding a bicycle	65.1%	63.8%	71.8%	68.3%	1870
I need my car to do many of the things I like to do	79.5%	86.4%	76.1%	78.3%	1882
I need my car to carry shopping or children	74.4%	81.2%	72.1%	73.8%	1875
I try to limit my driving as much as possible	56.5%	44.2%	51.0%	52.7%	1876
There are good bicycle lanes and paths in the areas I need to go	39.0%	37.7%	78.4%	58.6%	1878
I feel comfortable bicycling in the areas I need to go	31.6%	29.2%	65.7%	48.5%	1877
I know how to get around by bicycle in the areas I need to go	57.2%	54.5%	78.8%	67.8%	1874
Many of my friends or family or neighbors bicycle regularly	29.4%	24.0%	61.1%	44.8%	1876
Bicycling is a normal mode of transportation for adults in my community	36.6%	18.8%	79.1%	56.4%	1879
Many bicyclists I see appear to spend a lot of money on their bicycle and accessories	36.7%	29.2%	35.9%	35.7%	1879
Many bicyclists I see appear to have little regard for their personal safety	32.8%	39.6%	41.0%	37.5%	1879
Many bicyclists I see look like they are too poor to own a car	9.4%	19.5%	4.0%	7.5%	1877
Travel time is generally wasted time	29.8%	27.9%	24.2%	26.8%	1879

Few respondents reported having experience with bike-sharing at the time of the survey (Table 9). Only 16% of respondents said they had ever used a bike-share system. Among those who had, the vast majority had used such a system at most a few times. A majority of all respondents said that it was unlikely that they would use the Sacramento bike-share system when it opens (40%) or that they definitely would not (16%); just 7% said that they definitely would. Among those who said that they were at least somewhat likely to use the system, the majority said that they would use the system just a few times per year. Davis respondents were more likely to say that were unlikely to use the system and to use it rarely if they did use it, consistent with the higher level of bike access and bike use already found in Davis.

Table 9. Bike share system experience

	Sacramento	West Sacramento	Davis	Total	n
<i>Have you every used a bike share system?</i>					
Yes	16.2%	12.3%	15.9%	15.7%	1887
No	83.8%	87.7%	84.1%	84.3%	
<i>If yes, how many times have you used a bike share system?</i>					
Only once	38.9%	61.1%	45.0%	43.3%	293
2-5 times	46.8%	33.3%	42.3%	43.7%	
6-10 times	6.3%	0.0%	4.0%	4.8%	
More than 10 times	7.9%	5.6%	8.7%	8.2%	
<i>How likely is it that you would use the Sacramento bike share system when it opens?</i>					
Definitely will	9.0%	8.4%	5.3%	7.1%	1887
Fairly likely	16.4%	14.2%	11.4%	13.7%	
Somewhat likely	23.8%	29.0%	20.8%	22.7%	
Not likely	37.3%	31.6%	44.1%	40.2%	
Definitely not	13.5%	16.8%	18.4%	16.2%	
<i>If at least somewhat likely, how often do you think you might use the system?</i>					
Few times per year	49.9%	48.8%	65.1%	56.3%	822
1-2 times per month	34.9%	36.3%	22.3%	29.6%	
1-2 times per week	13.2%	13.8%	10.1%	11.9%	
every day	2.1%	1.3%	2.5%	2.2%	

Differences across cities in access to, use of, and attitudes towards travel modes may be tied to differences in socio-demographic characteristics among respondents (Table 10). Davis respondents were the youngest on average and had the highest average number of household members⁴ over the age of 16, as might be expected given the large population of UC Davis students and recent graduates. The final sample is skewed toward females at 55%. The breakdown by race/ethnicity mirrors that of the region and is similar across cities, though the share of Asian respondents is substantially higher in Davis than the other two cities. Davis respondents are the most likely to have graduate degrees, while West Sacramento respondents are the most likely to report high school as their highest level of education. Fully 95% of respondents currently have a driver’s license, and only 3% report never having had a license. Income is relatively evenly distributed across the categories specified, though a high share of Davis respondents report an income of \$25,000 or less, consistent with the student population.

Table 10. Socio-Demographic Characteristics

	Sacramento	West Sacramento	Davis	Total
Number	781	155	929	1865
Average age	56.6	48.7	44.9	50.1
<i>Household size</i>				
Household members >16 yrs	1.7	1.8	2.7	2.2
Household members <16 yrs	0.5	0.7	0.7	0.6
<i>Gender</i>				
Female	55.0%	53.6%	55.3%	55.0%
Male	43.2%	43.1%	44.4%	43.8%
<i>Race/Ethnicity</i>				
Black	5.6%	3.4%	0.9%	3.0%
Hispanic	7.3%	8.2%	7.0%	7.2%
White	74.1%	73.5%	73.3%	73.7%
Asian	9.1%	9.5%	15.1%	12.2%
Pacific Islander	0.5%	0.7%	0.2%	0.4%
American Indian	0.4%	1.4%	0.0%	0.3%
Other	2.9%	3.4%	3.4%	3.2%
<i>Highest Education Level</i>				
No formal education	0.0%	0.6%	0.1%	0.1%
Grade school or junior high	0.3%	1.9%	0.2%	0.4%
High school or GED	11.1%	20.6%	15.5%	14.1%
Associate or technical	15.2%	20.6%	6.3%	11.2%
Bachelor’s degree	39.4%	25.2%	33.2%	35.1%
Graduate degree	34.0%	31.0%	44.7%	39.1%

⁴ The question did not define “household” or specify whether or not unrelated people living with the respondent should be included in the response.

Table 10. Continued

	Sacramento	West Sacramento	Davis	Total
<i>Driver's License</i>				
Yes	96.8%	91.6%	94.1%	95.0%
In the past	1.8%	5.2%	1.0%	1.6%
Never	1.4%	3.2%	5.0%	3.3%
<i>Personal/Household Income</i>				
<25k	15%	15%	29%	22%
25-50k	18%	20%	13%	16%
50-75k	18%	12%	11%	14%
75-100k	13%	15%	13%	13%
100-125k	12%	15%	11%	12%
125-150k	8%	9%	7%	7%
>150k	16%	13%	16%	16%

References

Castillo-Manzano, José I., Mercedes Castro-Nuño, and Lourdes López-Valpuesta. "Analyzing the transition from a public bicycle system to bicycle ownership: A complex relationship." *Transportation Research Part D: Transport and Environment* 38 (2015): 15-26.

DeMaio, Paul. "Bike-sharing: History, impacts, models of provision, and future." *Journal of Public Transportation* 12.4 (2009): 3.

Fishman, Elliot, Simon Washington, and Narelle Haworth. "Bike share: a synthesis of the literature." *Transport Reviews* 33.2 (2013): 148-165.

Schoner, Jessica, Greg Lindsey, and David Levinson. *Is Bicycling Contagious? Effects of Bike Share Stations and Activity on System Membership and General Population Cycling*. No. 000137. University of Minnesota: Nexus Research Group, 2015.

Shaheen, Susan, Stacey Guzman, and Hua Zhang. "Bikesharing in Europe, the Americas, and Asia: past, present, and future." *Transportation Research Record: Journal of the Transportation Research Board* 2143 (2010): 159-167.

Appendix A: Recruitment Letter

UNIVERSITY OF CALIFORNIA, DAVIS

BERKELEY • DAVIS • IRVINE • LOS ANGELES • MERCED • RIVERSIDE • SAN DIEGO • SAN FRANCISCO



• SANTA BARBARA • SANTA CRUZ

INSTITUTE OF TRANSPORTATION STUDIES

ONE SHIELDS AVENUE
DAVIS, CALIFORNIA 95616-8576

April 15, 2016

Dear Sacramento Area resident,

The Institute of Transportation Studies at the University of California, Davis is conducting a study to learn more about the choices that people make about their daily travel. By understanding these choices, city officials can better address the transportation needs of your community.

We are hoping that you will be able to help by sharing your own views and experiences with us in a short survey. We randomly selected your address from a database of addresses within the Sacramento area. Because we are only sending this invitation to a small sample of residents, your response is extremely important.

The survey will ask you questions about how you get around your community and will take about 10 minutes to complete. Your participation in this survey is voluntary, your responses will be completely confidential, and the results will be published only in summary form without connection to any individual.

The survey is being conducted on the internet. To complete the survey, please enter the address <http://www.its.ucdavis.edu/survey> into your favorite web browser (such as Chrome or Firefox). If you would rather complete a paper version of the survey, please contact us as indicated below and we will happily mail you the survey with a postage-paid business reply envelope.

Everyone who completes the survey by *April 30, 2016* will be entered into a drawing for *10 cash prizes of \$100 each*. Everyone can be entered in the drawing regardless of participation: if you prefer not to participate in the survey but want to be included in the drawing, please email me at slhandy@ucdavis.edu. Because of the limited number of surveys that will be completed, your chances of winning will seldom be higher! If you are unable to fill out the questionnaire by April 30, 2016, please complete it as soon as possible. You must be at least 18 years old to complete this survey.

Thank you in advance for your participation in this important study. If you are interested in our results, look for them in the future on our web site at <http://its.ucdavis.edu>. If you have any questions, feel free to contact me at (530) 752-5878 or slhandy@ucdavis.edu.

Sincerely,

A handwritten signature in black ink, appearing to read "S Handy".

Professor Susan Handy, Project Director

Appendix B: Reminder Postcard

Locals Needed for Quick UC Davis Survey!

Last week a letter requesting your participation in a study regarding your daily travel was mailed to you. We randomly selected your address from a database of addresses within the Sacramento area.

In the letter, we asked you to complete an online survey using this link: its.ucdavis.edu/survey. If you have already completed the survey, please accept our sincere thanks. If not, please do so today. We are especially grateful for your help! Our study wouldn't be possible without your community's input.

Everyone who completes the survey by ***April 30, 2016*** will be entered into a drawing for ***10 cash prizes of \$100 each***. You must be at least 18 years old to complete this survey. If you would like to be entered into the drawing without participating, have any questions about our study or would like a physical copy of the survey sent by mail, feel free to contact me at (530) 752-5878 or slhandy@ucdavis.edu.

Thank you,

Professor Susan Handy, Project Director

Appendix C: Survey Instrument

Sacramento Area Transportation Survey

The Institute of Transportation Studies at the University of California, Davis is conducting a study to learn more about the choices that people make about their daily travel. By understanding these choices, city officials can better address the transportation needs of your community.

This survey asks you questions about how you get around your community. This survey takes about 10 minutes to complete. Your participation in this survey is voluntary, your responses are completely confidential, and the results will be published only in summary form without connection to any individual.

After completing the survey you will be entered into a drawing for ten \$100 Visa gift cards. Everyone can be entered in the drawing regardless of participation: if you prefer not to participate in the survey but want to be included in the drawing, please email me at dheckathorn@ucdavis.edu. To be included in the drawing, please complete the survey (or contact me) by April 30, 2016. If you are unable to complete the survey by then, we would still welcome your responses for some time afterwards.

Thank you for participating!

Your daily travel

1. In the last 7 days, did you have access to a MOTOR VEHICLE like a car, truck, or motorcycle that you can use either as a driver or passenger?

Always
 Most of the time
 Sometimes
 Rarely
 Never

2. In the last 7 days, was there bus or train service within a 5 minute walk of your home?

No
 Yes
 Don't know/not sure

3. In the last 7 days, did you have access to a BICYCLE?

Always
 Most of the time
 Sometimes
 Rarely
 Never

4. Were you out of town during the last 7 days?

No
 Yes - if yes, how many days? _____

5. During the last 7 days (up to yesterday), on how many days did you:

Drive or ride in a car?	_____ days
Ride on a bus or train?	_____ days
Walk outdoors for more than 10 minutes at a time?	_____ days
Bicycle for any purpose?	_____ days
Bicycle to or from public transit?	_____ days
Bicycle to or from work or school?	_____ days

Bicycle to get somewhere OTHER than work, school, or public transit (e.g., to go shopping, see a friend, or eat a meal)	_____ days
Ride a bicycle for exercise or recreation, without having a destination for the trip	_____ days

6. DURING A TYPICAL WEEK, how do you USUALLY get to:

	Drive or ride in a car	Ride a bike	Ride a bus or a train	Walk	Other	I don't go there
Your workplace	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Your school	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Your usual grocery store	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Your bank or post office	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A restaurant you like	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A family/friend's home	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A medical appointment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

7. DURING A TYPICAL WEEK, how many days does your commute to work or school include any of the following forms of transportation? If you don't commute, mark as "0".

Walking for more than 10 minutes at a time?	_____ days
Bicycling	_____ days
Taking public transit (for example, a bus or train)	_____ days
Driving yourself	_____ days
Riding as a passenger with someone else	_____ days

8. DURING A TYPICAL WEEK, about how many miles do you drive? Please do not include any driving while "on the clock" for your job. If you don't drive, mark as "0".

_____ miles

9. How many motor vehicles are there in your household? (For example, cars, trucks, or motorcycles.)

Number of motor vehicles: _____

10. What is the year, make, model and annual miles driven (please provide your best estimate) for each vehicle (up to 5) in your household:

	YEAR	MAKE (e.g. Ford)	MODEL (e.g. Focus)	Miles Driven During the Past 12 Months
Vehicle #1				
Vehicle #2				
Vehicle #3				
Vehicle #4				
Vehicle #5				

11. How often do you do the following:

	Every day or almost every day	A few times per week	A few times per month	A few times per year	Not used in the last year	Never
Ride a bicycle?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Use a car-sharing service like Zipcar, etc.?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Use a ride-sharing service like Lyft, Uber, etc.?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

12. What types of activities do you use car-sharing services like Zipcar for? (Check all that apply)

- Running daily errands (such as grocery shopping, going to the bank or a medical appointment)
- Moving large items (such as furniture or hardware supplies)
- Commuting to work or school
- Picking up or dropping off a friend or family member
- Recreational activities (such as visiting friends, hiking, or road trips)
- Other – Please specify _____
- I never use car-sharing services

13. What types of activities do you use ride-sharing services like Lyft and Uber for? (Check all that apply)

- Traveling to or from the airport
- Commuting to work or school
- Running daily errands (such as grocery shopping, going to the bank or a medical appointment)
- Going out to a bar, club or restaurant
- Visiting friends or family
- Other – Please specify _____
- I never use ride-sharing services

Your opinions about transportation

14. Please indicate your level of agreement with the following statements. There are no right or wrong answers.

	Strongly Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Strongly Agree
I like driving a car	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I like using public transit	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I like riding a bicycle	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I need my car to do many of the things I like to do	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I need my car to carry shopping or children	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I try to limit my driving as much as possible	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
There are good bicycle lanes and paths in the areas I need to go	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I feel comfortable bicycling in the areas I need to go	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I know how to get around by bicycle in the areas I need to go	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Many of my friends or family or neighbors bicycle regularly	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Bicycling is a normal mode of transportation for adults in my community	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Many bicyclists I see appear to spend a lot of money on their bicycle and accessories	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Many bicyclists I see appear to have little regard for their personal safety	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Many bicyclists I see look like they are too poor to own a car	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Travel time is generally wasted time	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Your interest in using the proposed Sacramento Bike Share System

The Sacramento Area Council of Governments (SACOG) is planning to open a bike share system with stations in Sacramento, West Sacramento, and Davis sometime in 2017.

A bike share system allows users to rent sturdy bicycles, using a debit or credit card at the station kiosk, and then return the bicycle at the end of their trip to any of the many stations in the system. Bike share systems are used by visitors to see the sights and by residents for commuting to work or school, running errands, or enjoying days off.

We have a few questions about how you might use the Sacramento Bike Share System. Because the system has not yet been installed, some of your answers may depend on details that we cannot provide to you right now. Please just answer as best as you can with the information given.

15. Have you ever used a bike share system before, in another city? No Yes
16. How many times have you used a bike share system?
- Only once
 - 2-5 times
 - 6-10 times
 - More than 10 times
17. How likely is it that you would use the Sacramento bike share system when it opens?
- Will definitely use it
 - Fairly likely
 - Only somewhat likely
 - Not very likely
 - Will definitely NOT use it

IF AT LEAST SOMEWHAT LIKELY: How often do you think you might use the system?

- | | | | |
|--------------------------|----------------------------|---------------------------|--------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| A few times
per year | Once or twice
per month | Once or twice
per week | Nearly every day |

A few things about you

Thank you so much for your input! In this last section, we would like to learn a little more about you. Remember, this information will remain anonymous.

18. What is your age? _____ years
19. What is your gender identity?
- Male
 - Female
 - _____ (please specify)
20. Please tell us which race/ethnicity best describes you (select all that apply):
- Black/African American
 - Pacific Islander/Native Hawaiian
 - Hispanic/Latino
 - American Indian/Alaskan Native
 - White
 - _____ (please specify)
 - Asian
21. How many people live in your household, including you?
- Number of people under 16: ____
- Number of people 16 years and older: ____
22. What is your highest completed level of education?
- No formal education
 - Bachelor's degree(s)
 - Grade school or Jr. High
 - Graduate degree(s)
 - High School Diploma or GED
 - Associate or technical certificate
23. Do you have a driver's license issued by a U.S. state?
- Yes
 - In the past but not currently
 - Have never had one
24. Do you currently have any physical or other health conditions that prevent:
- Your ability to walk? No Yes
- Your ability to bike? No Yes
25. How would you rate your ability to ride a bike?
- I cannot ride a bike at all because I do not know how
 - I can ride a bike, but I am not very confident doing so
 - I am somewhat confident riding a bike
 - I am very confident riding a bike

26. Where do you live?

- ₁ Sacramento
- ₂ West Sacramento
- ₃ Davis – *please answer the extra questions for Davis residents at the end of the survey!*

Please tell us what street intersection is nearest to your home. (Remember that all information you provide is strictly confidential and for research purposes only.)

Street #1: _____

Street #2: _____

27. Are you currently employed?

- ₁ Full-time
- ₂ Part-time
- ₃ Student
- ₄ Homemaker
- ₅ Not currently working
- ₆ Permanently unable to work
- ₇ Retired

IF EMPLOYED: What is the approximate location of your workplace (nearest street intersection and city)?

Street #1: _____

Street #2: _____

City: _____

IF A STUDENT: What is the approximate location of your school (nearest street intersection and city)?

Street #1: _____

Street #2: _____

City: _____

28. Do you live with family members or others with whom you share income? ₁ No ₂ Yes

29. Last year, what was your approximate personal income (if NO to previous question) or household income (if YES to previous question) before taxes?

- ₁ Less than \$10,000
- ₂ \$10,000-25,000
- ₃ \$25,001-50,000
- ₄ \$50,001-75,000
- ₅ \$75,001-100,000
- ₆ \$100,001-125,000
- ₇ \$125,001-150,000
- ₈ \$150,001-175,000
- ₉ \$175,001-200,000
- ₁₀ More than \$200,000