

1 **IMMIGRATION, INCOME, AND PUBLIC TRANSIT PERCEPTIONS:**
2 **FINDINGS FROM AN INTERCEPT SURVEY**

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25 Word count: 7,414 (Abstract: 190; text: 4,807; references: 917; 4 figures; 2 tables)

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33 Submission Date: July 29, 2016

34 Revised Submission Date: November 15, 2016

1 ABSTRACT

2 As large numbers of immigrants continue to settle in the US over the next decades, planners will
3 want to consider how this demographic trend could impact urban transportation patterns,
4 including public transit use. This paper uses intercept survey data from 1,247 public transit riders
5 in the San Francisco Bay Area to explore how mode choices and travel experiences may differ
6 for low-income immigrants as compared to higher-income immigrants and US-born residents.
7 Low-income immigrants were less likely to have a bus pass or access to a bicycle. They were
8 also far more likely to substitute driving for taking public transit than all other immigrant and
9 income groups. The results suggest that while several public transit experiences are similar
10 across immigrant status and income groups, transportation access for low-income immigrants is
11 more constrained and alternative modes may need to be negotiated when public transit does not
12 serve they types of trips they need to make. The results also underscore the importance of
13 collecting data on country of origin in conjunction with travel behavior data, because travel
14 behavior and experiences are in some ways more burdensome for low-income immigrants than
15 for other groups.

1 INTRODUCTION

2 Over 40 million immigrants live in the United States, comprising about 13 percent of the
3 population (1), and the US Census Bureau projects that the foreign-born population will grow to
4 around 20 percent by 2060 (2). If recent trends continue, evidence suggests that new immigrants
5 will earn substantially lower incomes than their US-born counterparts and experience slower
6 wage growth than earlier immigrant cohorts (3). There is a rich national discourse on how this
7 influx of low-income immigrants will influence and integrate into employment, education, and
8 health care in the US., but few researchers or policy makers have explored how newcomers will
9 access those jobs and services or how their demand will impact transportation systems (4). The
10 impacts could be substantial; for example, public transit ridership levels are closely tied to the
11 rise and fall of immigration (e.g., 5). The impacts are particularly crucial for low-income
12 immigrants; they take transit at more than twice the rate of higher-income immigrants (5) and
13 face unique challenges, such as language barriers, when doing so (e.g. 6). Furthermore, the jobs
14 lower-income immigrants often hold, such as those in the service or construction industries, are
15 spatially dispersed and not well-connected by transit (7, 8).

16 To help fill this gap in knowledge, the paper addresses two questions about travel by low-
17 income immigrants. We focus on the experiences of those who ride public transportation:

- 18
19 1. How, and how often, do low-income immigrant public transit riders travel compared to
20 others?
- 21
22 2. How do their attitudes toward and perceptions of public transit compare to those of
23 others?

24
25 To explore these questions, we relied on an intercept survey that we designed and
26 administered in the central San Francisco Bay Area, a region where 7 percent of unlinked trips
27 are by public transit (9). Most survey sites were at transit stops that served a high proportion of
28 Latin American immigrants. The survey data allows us to quantify transportation mode use and
29 to measure transportation experiences, and to do so making comparisons between immigrant and
30 US-born respondents, and low- and higher-income groups. We focused particularly on
31 comparing low-income immigrants to other groups because we expected that the former are
32 likely to face unique barriers in accessing and using public transportation.

33 The remaining sections of this paper review relevant research, describe the research
34 design, and then compare low-income immigrants' travel patterns and experiences with the US-
35 born and those of higher income. The paper concludes by discussing the broader relevance of the
36 findings, describing future research needs, and offering recommendations for policy.

37 IMMIGRANTS AND TRAVEL: A BRIEF LITERATURE REVIEW

38 There is relatively little information available about immigrants and travel because most travel
39 surveys do not ask about immigrant status. Most of the information about immigrant travel in the
40 US comes from nationally representative travel surveys, such as the National Household Travel
41 Survey or custom-designed surveys, but most other travel surveys typically do not identify a
42 respondent's birth country. However, a few scholars have specifically looked at immigrant travel
43 in the US, and they find that immigrants are more likely to take public transit, carpool, bicycle,

1 and walk compared to non-immigrants, after controlling for a variety of demographic,
2 socioeconomic, and spatial characteristics (11, 12, 13, 14, 15).

3 Immigrants are not a homogeneous group, and several of these studies have looked
4 specifically at low-income immigrants. Low-income immigrants own fewer cars, drive less, and
5 generally use autos less than higher-income immigrants, though the estimated magnitude of these
6 effects often varies by country of origin (8, 14). Others have found that lower-income
7 immigrants use transit and carpool more often than higher-income immigrants (12, 15). Finally,
8 Smart (13) found that lower-income immigrants are more likely to bicycle than higher-income
9 immigrants, with the effects of income on bicycle use stronger for immigrants than for US-born
10 residents.

11 There are different arguments and evidence about why immigrants might travel
12 differently than the US-born. Some have suggested there is an unexplained “immigrant effect”—
13 latent cultural attributes that affect daily travel. As immigrants remain in the US and replace their
14 sustainable transportation trips with driving over time, these differences diminish, but persist
15 even two decades after first immigrating (5, 14). Others argue that workplace area characteristics
16 and neighborhood preferences may account for much of the remaining variation in travel instead
17 (7, 8, 15). For example, strong social network ties for those living in immigrant enclaves may
18 promote carpooling if neighbors are commuting to shared occupational locations (12, 16). Smart
19 (13) found that living in an immigrant neighborhood predicts mode choice more strongly for
20 immigrants than for non-immigrants, with the strongest influences seen for bicycling and
21 walking (17). But most immigrants do not live in immigrant enclaves; they may drive more if
22 they move to the suburbs or take public transit more if they live in the urban core like their US-
23 born counterparts (18).

24 Few studies have explored immigrants’ perceptions of the transportation options in their
25 communities, despite evidence that attitudes and perceptions may significantly influence travel
26 (19, 20, 21). A focus group study found that Mexican immigrants in California valued several
27 features of public transit, including the cost savings, geographic reach, and comfort, while
28 identifying long wait times, limited routes, and limited frequency as common disadvantages (22).
29 Another study found that immigrants in New Jersey who had limited English proficiency
30 perceived public transit systems as discriminatory because there were not instructions in their
31 languages or because bus operators treated non-English speakers poorly (6).

32 RESEARCH DESIGN

33 We administered a self-completion intercept survey to explore mode use and public transit
34 perceptions among public transit users we intercepted at 44 sites across the San Francisco Bay
35 Area. We chose an intercept survey over other survey methods to obtain a sufficient number of
36 responses from low-income immigrants. Because they are such a low proportion of all people in
37 the population, the best way to reach a sufficient number was to approach them while they were
38 on their way to or from transit. Also, intercept methods are often more successful than random
39 mail or phone surveys at reaching “shy” groups, including undocumented immigrants (23). The
40 non-random nature of the intercept survey prohibits us from generalizing the data to the full
41 metropolitan area population, but the method does allow us to conduct comparisons between
42 low-income immigrants and others in our sample (24).

1 **Questionnaire**

2 The survey asked questions in three categories: recent travel, transportation experiences, and
3 personal information. (See (25) for the survey instrument.) In the *recent travel* section, people
4 reported their travel in the seven days prior to taking the survey. They noted how many days they
5 drove, carpooled, cycled, walked, or took public transportation. Respondents who traveled by
6 bus or rail reported their access and egress modes. Respondents also reported the number of days
7 they had access to a bicycle and a motor vehicle. We asked about vehicle access rather than
8 ownership because some low-income and immigrant families rely on borrowing cars as a
9 mobility strategy (26, 27). *Transportation experiences* refers to the collection of respondents'
10 attitudes, perceptions, and constraints with respect to daily travel. We asked respondents to
11 estimate how much more they would have taken public transit and bicycled given hypothesized
12 changes in crime, the ease of using bikes with transit, transit cost, and bikeway provision. We
13 also asked them to report how often they substituted one mode for another and how much they
14 agreed or disagreed with statements about public transit and bicycling. Finally, the *personal*
15 *information* section collected standard demographic and socioeconomic information, as well as a
16 home address or a street intersection near their home.

17 To develop the questions, we reviewed other travel survey questionnaires and analyzed
18 interviews with Latin American immigrants recruited through social service organizations (see
19 details in (25)). Before finalizing the questionnaire, we pre-tested the survey on a convenience
20 sample of respondents in both English and Spanish and then pilot tested in the field.

21 **Survey Locations and Procedures**

22 We designed the sampling method to over-represent low-income Latino immigrants who ride
23 transit, with additional emphasis on obtaining responses from people who access transit by bike.
24 We targeted this group of immigrants because Latin America is the most common region of
25 origin for immigrants in the San Francisco Bay Area (28). To find our desired respondents within
26 the central Bay Area, we identified census tracts that ranked in the top third within each large
27 urban county along the following dimensions: the proportion of foreign-born residents, the
28 proportion of the foreign-born population that earns less than \$25,000 per year, the median
29 income of the census tract, and the proportion of people who take public transportation to work.
30 This set of criteria was chosen after we tested several other combinations of variables that
31 yielded similar neighborhood selections.

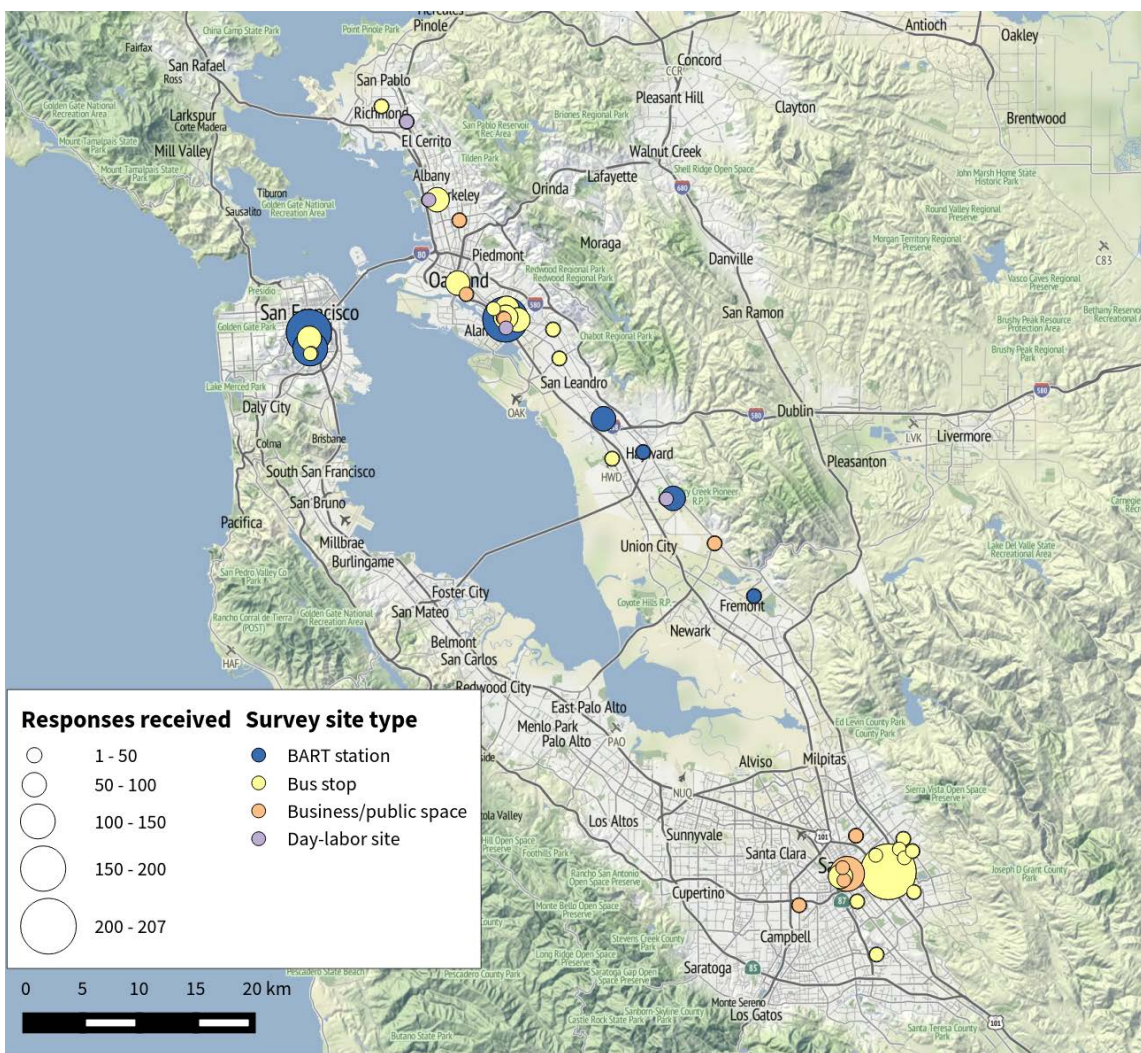
32 Within the selected Census tracts, we surveyed at 44 locations of different types: mainly
33 high-ridership rail and bus stops (two thirds of sites), and also public plazas, businesses that cater
34 to immigrants, and sites where day laborers congregate waiting for work opportunities. Figure 1
35 shows the survey locations and number of responses at each.

36 In order to sample as diverse a set of people as possible at high-traffic locations,
37 surveyors requested participation from every fifth person who arrived. At lower-traffic locations,
38 surveyors approached every person who arrived or was present. Surveyors were also instructed
39 to prioritize bicycle riders at high traffic sites to achieve a sufficient sample of cyclists. At least
40 one Spanish-speaking surveyor was present at each intercept site for 65 percent of the survey
41 shifts.

42 The survey was completed between October 2014 and March 2015, excluding only four
43 weeks during the winter holidays. The survey took approximately five minutes for each
44 respondent to complete and was designed to be finished at the intercept point, although four

1 percent of respondents mailed their surveys back. Surveyors offered potential respondents a
2 granola bar as an incentive to participate.

3 Thirty-three percent of people we approached completed a survey, generating 2,087
4 responses. Twenty-nine percent of those completed it in Spanish. Here we analyze responses
5 from the 1,247 survey respondents who reported their household income, reported whether they
6 were born in the US, and said that they took transit at least once in the previous seven days. (The
7 other 840 responses were missing data for at least one of those categories.)



8
9 **FIGURE 1 Intercept survey locations, coded by number of responses received and survey**
10 **site type.** Sources: base layer design by Stamen Design; base layer data from OpenStreetMap.

11 **Definitions**

12 For clarity, we define three terms we use throughout the remainder of this paper. *Immigrant*
13 means anyone who was born outside of the United States. *A transit rider* is someone who took
14 public transportation at least one day in the previous seven days. *Low-income* refers to
15 households that earned less than \$25,000 in the previous year. We chose the \$25,000 income
16 threshold for both theoretical and practical reasons. The federal poverty limit for a family of four

1 in 2014 was \$23,850 (29), while the US Department of Housing and Urban Development defined
2 extremely low-income families of four in the San Francisco Bay Area as those earning between
3 \$27,600 and \$33,200, depending on the county (30). Because the average household in the
4 survey sample had 3.6 people, we chose the closest income category to these thresholds. The
5 threshold also splits the dataset roughly in half with respect to low- and higher-income
6 respondents.

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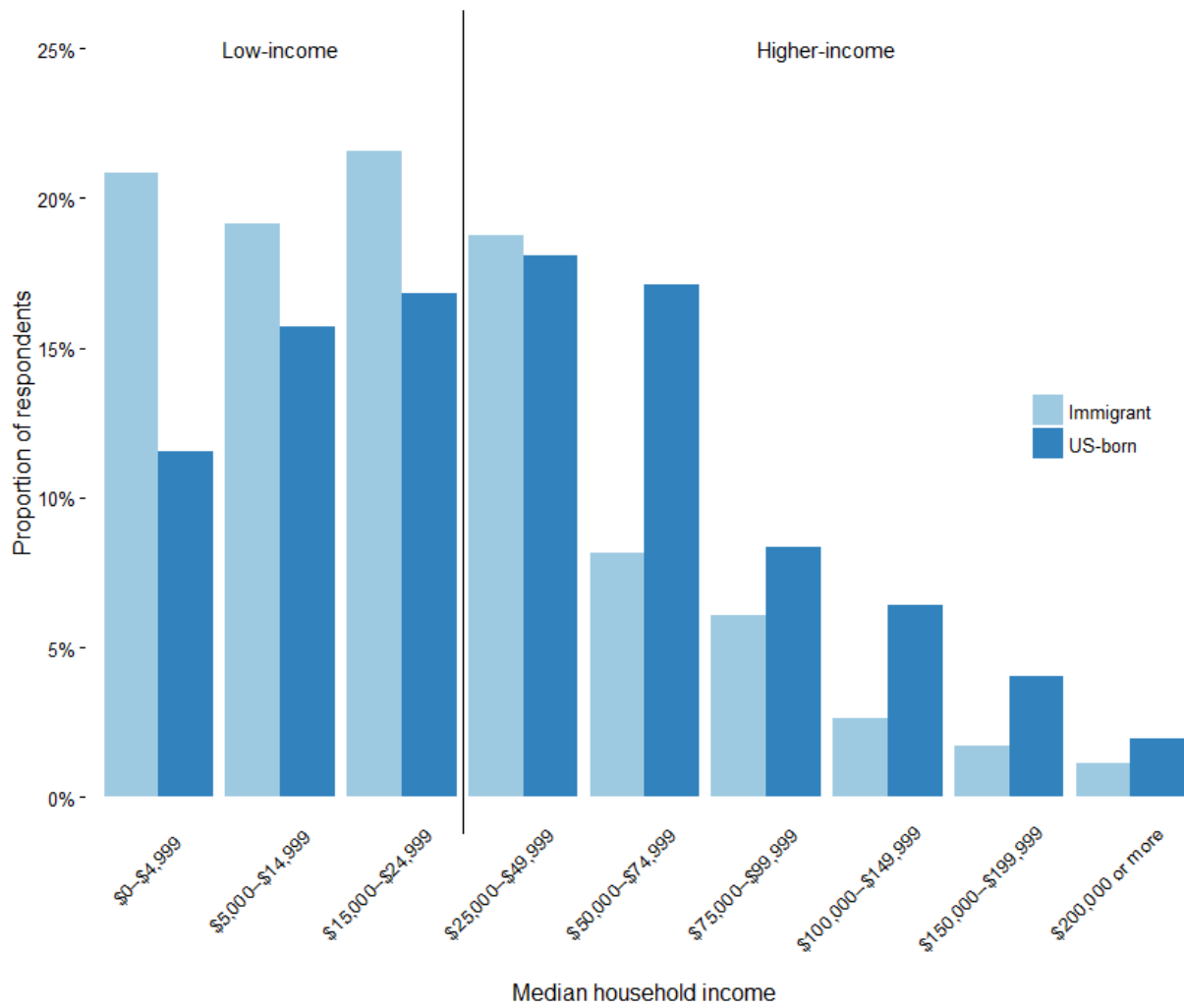
8 **RESULTS**

9 **Respondent Demographics**

10 The survey sampling method successfully oversampled immigrants, and Latino immigrants in
11 particular. About 44 percent of respondents said they were born outside the United States,
12 compared to 32 percent in the central San Francisco Bay Area (28). On average, these
13 immigrants had lived in the country for 15 years, though 22 percent had arrived within the
14 previous five years. The most common country of origin was Mexico, at just under half of
15 immigrants who answered that question. In total, 68 percent of respondents reported they were
16 from Central America. By comparison, the American Community Survey estimated that 27
17 percent of San Francisco Bay Area residents were from Central America (which includes
18 Mexico).

19 Immigrant transit riders earned less than the US-born, on average. Of respondents who
20 provided their household income, 62 percent of immigrants reported a household income of less
21 than \$25,000, compared to 44 percent of the US-born. The median household income category
22 for immigrant respondents was \$15,000–\$24,999, while it was \$25,000–\$49,999 for the US-
23 born. Figure 2 shows respondents' income distribution classified by nativity.

24 Low-income immigrants faced socioeconomic disadvantage in several other key ways
25 (see Table 1). Nearly half the low-income immigrants had less than a high-school education,
26 almost five times as many as the next highest group. They were less likely to be employed than
27 people in the higher-income group, and less likely to be in school than those born in the United
28 States. Fewer than one in ten low-income immigrants owned their homes, compared to a quarter
29 of higher-income immigrants and a third of the higher-income US-born respondents.



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FIGURE 2 Income distribution by nativity status. The vertical bar divides the chart into low-income and higher-income categories, as defined in this paper.

1 **TABLE 1 Comparison of respondents' sociodemographic characteristics by nativity and**
 2 **income group**

	Low-income immigrant	Higher-income immigrant	Low-income US-born	Higher-income US-born
<i>Proportions (%)</i>				
Race/ethnicity				
Hispanic	81.6	53.0	40.5	31.0
Asian	12.8	34.3	4.5	6.0
White	1.3	7.5	23.6	31.2
Black	0.9	2.5	22.0	20.6
Two or more	0.6	0.5	4.2	6.0
Education				
Less than HS	45.2	9.6	5.4	0.5
High school	33.1	27.4	41.6	16.8
More than HS	21.6	62.9	52.9	82.7
Employed	57.8	77.8	55.8	81.1
In school	18.4	25.3	32.7	32.2
Female	46.3	49.3	47.6	43.8
Renter	93.4	76.0	89.7	66.5
<i>Means</i>				
Time in US (years)	16.1	15.0		
Age (years)	42.4	40.4	37.1	36.9
Household size (total)	3.9	3.9	3.6	3.3
Under age 16	1.3	1.2	0.9	0.8
Age 16 and over	2.8	2.7	3.0	2.5

3 Note: Bold indicates significant differences from low-income immigrant group, using two-sample equality of
 4 proportions or means tests ($p < 0.05$). Responses for individual variables differ than total responses because of
 5 missing values.
 6

7 Use of Transit and Other Travel Modes

8 The questionnaire asked respondents how frequently they had used various modes of
 9 transportation in the previous seven days (Table 2). The differences in travel patterns between
 10 low-income immigrants and other groups were mostly small. The single biggest difference
 11 between groups was the number of days walking. Low-income immigrants walked one day more
 12 often than higher-income immigrants, although about the same amount as the US-born in both
 13 income groups. There were smaller differences in bicycling and driving. For bicycling, low-
 14 income and higher-income immigrants bicycled about the same frequency, which was less than
 15 the US-born in both income groups. By contrast, when it came to driving, low-income

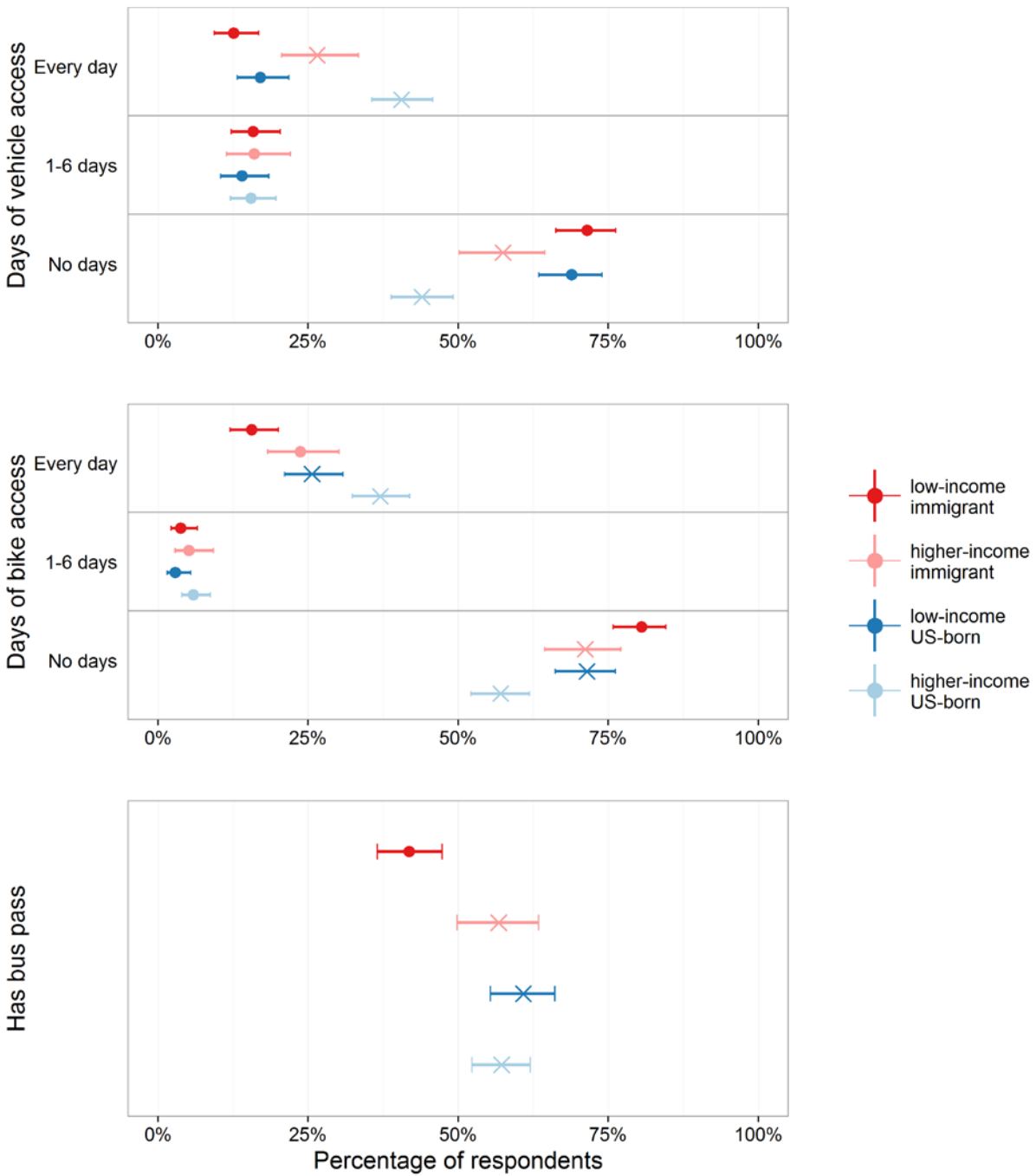
1 immigrants and the low-income US born were similar; both these groups drove less than either
 2 higher-income immigrants or higher-income US-born residents.

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 5 **TABLE 2 Mean number of travel days per week, per mode, by nativity and income group**

	Low-income immigrant	Higher-income immigrant	Low-income US-born	Higher-income US-born
Transit	4.9	4.7	5.1	4.9
Transit access mode				
Drive to transit	0.3	0.5	0.2	0.4
Ride to transit	0.4	0.5	0.4	0.6
Walk to transit	4.0	3.4	3.9	3.4
Bike to transit	0.4	0.5	0.8	0.9
Drive	0.6	1.1	0.7	1.3
Ride	0.8	0.9	0.9	1.1
Walk	2.7	1.7	2.5	2.3
Bike	0.6	0.7	0.9	1.0

6 Note: Bold indicates significant differences from the low-income immigrant group, using equality of means tests
 7 ($p < 0.05$).
 8

9 The survey also asked about transit riders' access to a motor vehicle, a bicycle, or a bus
 10 pass. For motor vehicles and bicycles, respondents were asked how many days in the previous
 11 seven they had access to a "working motor vehicle" and to a "working bicycle" (Figure 3).
 12 Fewer low-income immigrants had access to a motor vehicle than both higher-income groups,
 13 though their access was about the same as that for low-income US-born respondents. Only about
 14 one-quarter of low-income immigrants had access to a vehicle in the week prior to taking the
 15 survey, and only 12 percent had access every day that week. In contrast, almost a quarter of
 16 higher-income immigrants and about a third of the higher-income US-born had access to a
 17 vehicle every day. Low-income immigrants also had less access to bicycles than other
 18 comparison groups; only 15 percent had access to a bicycle every day, compared to a quarter or
 19 more of all other groups. Also, four of every five low-income immigrants lacked any access at all
 20 to a bicycle. Finally, low-income immigrants were also the least likely group to have a bus pass.
 21 Fewer than half did, compared to about 60 percent for all other groups. In summary, the low-
 22 income immigrant respondents had less access to transportation resources, constraining their
 23 ability to travel.
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FIGURE 3 Transportation resource access by nativity and income group. Notes: Error bars represent 95% confidence intervals. An X indicates that the value for that group is statistically significant different from the value for the low-income immigrant group ($p < 0.05$).

1 **Transportation Experiences**

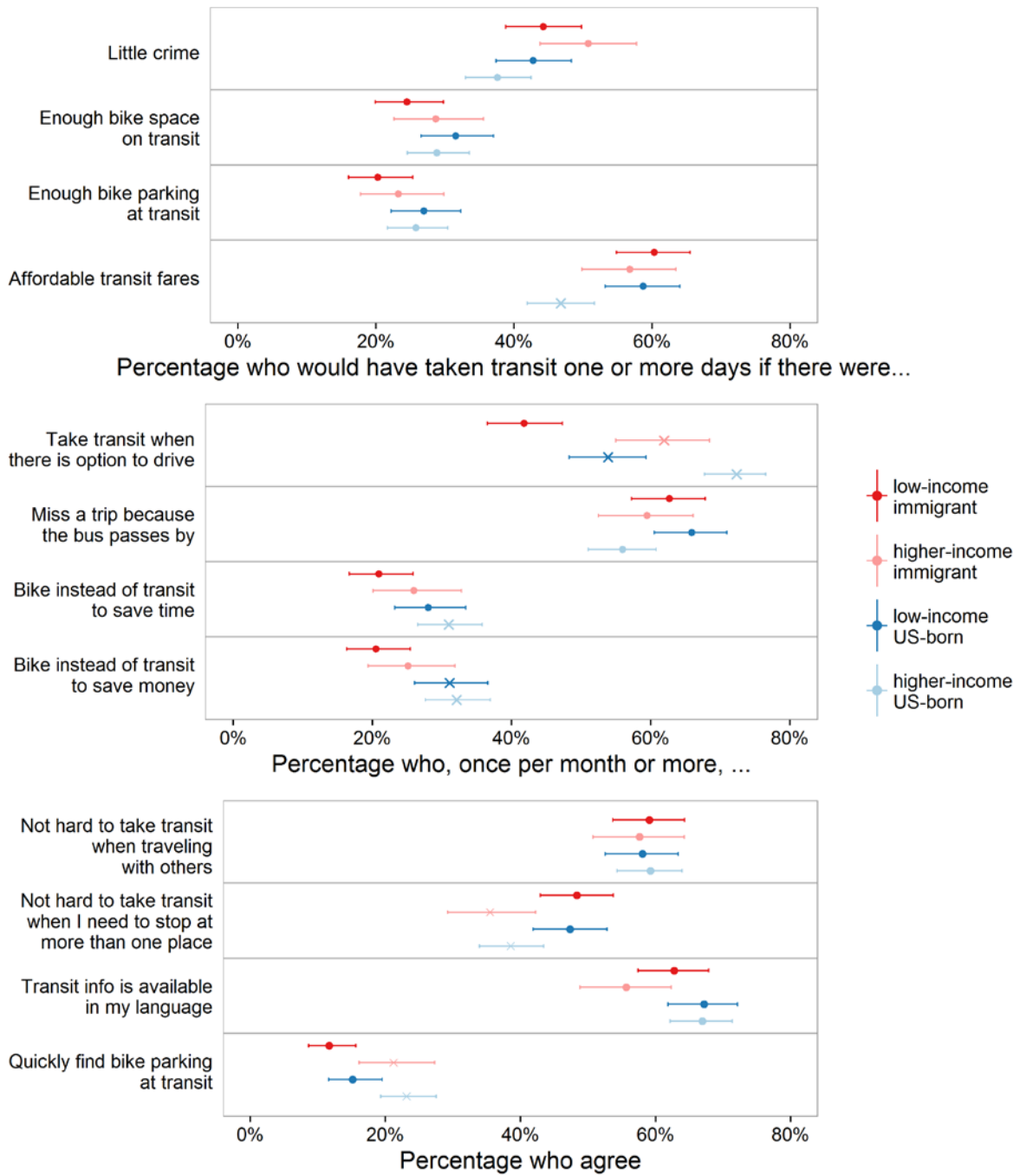
2 The second section of the survey asked respondents 12 questions about their experiences with
3 public transportation. (The survey had a total of 21 questions). Figure 4 shows the responses for
4 each question about public transit experiences, by nativity and income category. (All differences
5 or comparisons we report in the text are statistically significant at the 95 percent confidence
6 interval according to two-sample proportion tests.)

7 The experience questions prompted for a different type of answer, depending on which
8 question was asked. (See Appendix A of (25) for the exact question wording.) The first set of
9 questions asked respondents to estimate how much more they would have taken public
10 transportation in the previous seven days if certain statements about affordability, crime, and
11 bicycling together with transit were true. Respondents could answer “no change,” “1 day more,”
12 “2–3 days more,” or “4+ days more.” The second set of questions asked how often respondents
13 substituted modes of travel or missed trips in response to different situations. Respondents
14 indicated frequency with the options “never,” “at least once per month,” “at least once per
15 week,” and “more than once per week.” Finally, the third set of questions sought the degree to
16 which respondents agreed or disagreed with statements about public transit and bicycling,
17 including travel complexity, information availability, and ease of using bicycles together with
18 public transit. They indicated agreement on a five-point Likert-type scale.

19 Transit fare cost was a significant barrier for all transit riders except the higher-income
20 US-born group. About 60 percent of low-income immigrants said they would have taken public
21 transit at least one more day in the previous week if fares were more affordable, and the low-
22 income US-born and higher-income immigrants responded in much the same way. By contrast,
23 among the higher-income US-born, fewer than half reported they would take public transit more
24 often if fares were cheaper. One aspect of fare costs that did not vary among the four groups was
25 that for those to whom transit fares mattered at all, they mattered a lot. In every comparison
26 group, “four more days per week” was the most common response among people who said they
27 would take transit more if costs were lower—even for many respondents who were *already*
28 taking transit four or more days per week.

29 Immigrants were less likely than the US-born to view bicycling as a way to reduce their
30 spending on transit fares. Only 20 percent of low-income immigrants said they ever chose
31 bicycling over public transit in order to save money—as compared to one-quarter of low-income
32 US-born respondents and one-third of higher-income US-born residents. All four groups of
33 respondents perceived cycling as a way to save time over taking transit in a similar way. Low-
34 income immigrants were also significantly less likely than US-born respondents to agree that
35 they could quickly find bicycle parking at bus or train stops. Despite the potential advantages
36 cycling has over public transit with respect to saving money or time over short distances, low-
37 income immigrants were less likely to see cycling as a travel option for those reasons.

38 Low-income immigrants were more likely than all other groups to drive instead of taking
39 transit, if they had the option. About 58 percent of low-income immigrants responded that they
40 never took transit when they had the option to drive. In contrast, less than half of each of the
41 other comparison groups drove instead of taking transit. Of those who chose to take transit over
42 driving, the largest proportion of low-income immigrants did so more than once per week,
43 significantly less than other groups. Despite these responses, both low-income groups drove the
44 fewest days (Table 2) and had access to a motor vehicle the least often. Although a significant



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FIGURE 4 Transportation experiences, by nativity and income group. Notes: Error bars represent 95% confidence intervals. An X indicates that the value for that group is statistically significantly different from the value for the low-income immigrant group ($p < 0.05$).

1 proportion of each group responded that reduced crime would change how often they took
2 transit, a majority of respondents indicated that a reduction in crime would not affect their transit
3 use. There were no significant differences in how low-income immigrants responded as
4 compared to the other groups.

5 There was no consistent pattern in how low-income immigrants responded to the
6 complexity of taking public transit compared to others (Figure 4, bottom panel). About 60
7 percent of all respondents disagreed that it was difficult to take transit when traveling with
8 others, with no significant differences by immigrant or income status. However, low-income
9 immigrants were more likely than higher-income groups to agree it was easier to take transit to
10 multiple locations; about half compared to slightly more than a third of high-income immigrants
11 and US-born respondents. Although most low-income immigrants agreed that public transit
12 information was available in their language, 23 percent disagreed, significantly more than those
13 born in the United States (14 percent). Responses may reflect how groups use public transit
14 differently, such as traveling more often with children rather than peers or using rail more often
15 than buses, though we did not ask those questions directly.

16 We found no significant differences among groups in the responses to other questions we
17 asked about public transit. Roughly three-quarters of respondents indicated that additional bike
18 parking and space on buses and trains for their bikes would not change how frequently they took
19 transit. Furthermore, a majority of respondents indicated that a bus passing them by caused them
20 to miss a trip at least once a month. Also, the frequency with which each group missed a trip was
21 statistically indistinguishable from the low-income immigrant group.

22

23 **DISCUSSION AND SUMMARY OF FINDINGS**

24 Low-income immigrant respondents shared many travel behaviors and experiences with all three
25 comparison groups. For example, respondents across all four groups reported a similar number
26 of days per week that they used transit, carpoled, or drove to access transit. About the same
27 share had partial access to a vehicle or bicycle. And people in all four groups were equally
28 concerned with affordability, neighborhood crime, service reliability, transit access, and
29 sufficient information about public transit. The fact that respondents in all four groups had these
30 similar behaviors and experiences suggests that other factors, such as transit service or
31 neighborhood characteristics, shape their behavior in ways that are not directly influenced by
32 income or immigrant status.

33 But there were a few cases where different patterns stood out. In particular, low-income
34 immigrants were distinct from the other three groups in being less likely to have a bus pass, less
35 likely to have any access at all to a bicycle, and less likely to take transit for trips when they had
36 an option to drive. Regardless of income, immigrants tended to respond differently from the US-
37 born on most of the bicycling-related questions. Immigrants were less likely than the US-born to
38 have access to a bicycle every day, and they bicycled fewer days a week for any purpose,
39 bicycled fewer days a week to access transit, and were less likely to bicycle instead of taking
40 transit as a way to save money. Finally, in other ways low-income immigrant respondents were
41 similar to the low-income US-born but different from higher-income respondents regardless of
42 immigrant status. Lower-income respondents had less access to a private vehicle, drove fewer
43 days a week, walked to transit more days per week, and were less likely to quickly find bike
44 parking at transit stops.

1 Why is there so much similarity among groups? Many potential barriers to public transit
2 use are nearly universal. Most regular transit riders are equally concerned with affordability,
3 neighborhood crime, reliability, transit access, and sufficient information about public transit.
4 We surveyed a variety of people in the same neighborhoods who would be affected by transit
5 service quality and transportation infrastructure in the same ways. These findings suggest that the
6 local environment predicts travel behavior and attitudes more than income or immigrant status
7 do. On the other hand, other demographic variables may be more important than income,
8 immigrant status, or the local environment. For example, low-income immigrants were more
9 likely to find it hard to take transit with other people. The association might not result from some
10 innate variable related to their status as immigrants, but rather from household structure and the
11 need to travel with young children. Low-income immigrants averaged 1.3 children under the age
12 of 16 in their households, compared to 0.9 and 0.8 children for the low-income US-born and
13 higher-income US-born respondents, respectively.

14 Based on findings from interviews in a parallel research effort (25), we expected that
15 low-income immigrant transit riders might miss trips because buses passed them by more
16 frequently than others. Several interviewees recalled instances when buses drove by, apparently
17 still with open seats, or when bus operators were rude because the rider spoke limited English,
18 which interviewees attributed to intentional discrimination. Survey results suggest this
19 experience is uncommon; a bus passing by a rider is not an event unique to low-income
20 immigrants. It is encouraging that there do not appear to be disparate impacts with respect to
21 missed trips because of transit unreliability. On the other hand, over half of each respondent
22 group indicated buses passed them by at least once per month, and a quarter of all respondents
23 had a bus pass them by at least once per week, suggesting everyone could benefit from service
24 improvements.

25 We also expected concerns about crime to be a bigger issue for low-income immigrants
26 than for other respondents, as low-income immigrants are known anecdotally to be more exposed
27 to crime in public places and near their homes and workplaces. But our sampling frame limited
28 somewhat the range of spatial environments of respondent neighborhoods, regardless of
29 immigrant status and income, which likely dampened any such correlation. Significantly more
30 low-income immigrants reported affordability to be a bigger barrier to travel than crime; and
31 crime appears to impact the comparison groups about as much as it affects low-income
32 immigrants. This concurs with other research on transit access (31). Another possible
33 explanation is the fact that the surveys themselves were administered mainly at transit stops in
34 low-income neighborhoods, which research has linked to the incidence of transit crime (32). It is
35 possible that respondents thought about safety from crime based on the location of the stop rather
36 than their home or work locations

37 The largest difference between groups was the fact that low-income immigrant transit
38 riders were far less likely to take public transit for trips where they had the option to drive, which
39 might be true for a number of reasons. First, compared to higher-income groups, low-income
40 immigrants in the sample have lower access to personal vehicles. They may need to negotiate for
41 vehicle access for a specific purpose that transit does not serve. In other words, low-income
42 immigrants may drive only when they have no other good options, such as accessing health care
43 when ill, buying bulk groceries, or traveling outside the region (26). Others who have more ready
44 access to vehicles may be able to make a conscious decision as to whether to take transit or to
45 drive based on factors other than vehicle availability.

1 CONCLUSION

2 Differences in travel patterns and attitudes among low- and higher-income immigrants and US-
3 born respondents reveal the multiplicity of the immigrant experience. In several respects,
4 particularly with respect to bicycling experiences, immigrant respondents are similar regardless
5 of income. In other ways, low-income immigrants are unlike higher-income immigrants and
6 instead more likely to face the same barriers as US-born low-income individuals, such as with
7 respect to auto availability and the difficulty of using public transit to travel to multiple places.
8 Our results also suggest that low-income immigrants cycle less often than other groups, a novel
9 finding but, because of different methods, one that is not strictly comparable to other research
10 that comes to an opposite conclusion (13). And the largest difference among groups is how often
11 low-income immigrants are willing to take transit when they have the option to drive.

12 The study design limits the findings in a few ways. First, the dataset is limited to transit
13 riders, and cannot be generalized beyond the transit-riding population. Second, the non-random
14 sampling method prevents generalizing the results to all low-income immigrants and transit
15 riders in the San Francisco Bay Area. Nevertheless, in the context of data collection that
16 historically underrepresents the low-income immigrant population, we were able to achieve a
17 high number of responses that allow us to have high confidence in the comparisons we found
18 *between* population groups and provide some insight into likely travel behavior and attitudes for
19 low-income immigrants in general. In future, an option for generalizing claims more broadly
20 would be to systematically oversample immigrants in regional household transportation surveys.

21 Last, the analysis presented here does not control for factors that might explain
22 differences in travel according to immigrant status and income group, such as other
23 socioeconomic characteristics, urban form characteristics, or transportation infrastructure and
24 level of service. We plan to address this in future analysis of the data set so that we can better
25 explain the relationships between immigrant status, experiences on transportation, and mode use.

26 The study findings suggest a few implications for policy. A simple recommendation is for
27 public transit agencies to routinely collect immigrant status data in their periodic on-board
28 surveys to enable a better understanding of the needs and issues of immigrants. Although
29 providing surveys in different languages proxies somewhat for country of origin, our results
30 suggest that some differences in experiences between immigrants and others are strong enough
31 to warrant closer attention immigrant status. Finally, the fact that fewer low-income immigrants
32 take transit when they have the option to drive suggests they have needs that public transit does
33 not meet. The reasons behind those decisions and ways to solve them should be explored in more
34 detail through community-based transportation plans that improve specific mobility and
35 accessibility options.

36

37 ACKNOWLEDGEMENTS

38 The authors thank the Mineta Transportation Institute for funding this research. The authors also
39 thank Cecilia Chavez for assistance translating the survey and coordinating survey data
40 collection, and the following people for administering the survey: Sana Ahmed, Dylan Baker,
41 Sergio Escobedo, Rigo Garcia, Norma Guzman, Mariana Herrera, Christian Hunter, Melissa
42 Jeng, Michelle Li, Oscar Ruiz, Keith Tanner, and Tina Tran. The views expressed are the
43 authors' alone, as is the responsibility for any errors or omissions.

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