

Technical Appendix 5

Analysis of Preference in Support of Chapter 5

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INTRODUCTION AND STRUCTURE

This Technical Appendix explores the role of demographic categories on the present use of public transportation, and *values, preferences, and attitudes* relevant to the conditions supportive of public transportation. It explores the interplay of age and gender, and summarizes the evident role of ethnicity, migration, and the more-traditional socioeconomic categories of income, education, and employment. This work primarily uses a database describing values, preferences and attitudes created by RSG in 2014 for TransitCenter, which was described in Technical Appendix 2: **the source material for every figure and table in this Appendix is this 2014 survey.**

STRUCTURE: THE FIVE SUBJECT AREAS

This Technical Appendix examines five subject areas relevant to the study of transit markets; they are:

1. Attitudes and values about residing in a higher density urban community, supportive of transit
2. Attitudes and values about reliance on automobiles, and willingness to “share” vehicles
3. Attitudes and beliefs about the importance and relevance of environmental concerns
4. Attitudes and values about safety, crime, and privacy associated with public modes
5. Attitudes and preferences about what can be improved in transit service

Exploring Subject Areas by Age and Gender and by Eight Sociodemographic Categories

Each of the five subject areas discussed here are explored twice. First, the directly observed data items from the survey are examined as a function of age and gender together. Second, the survey responses are further examined in terms of dichotomous subgroups within eight sociodemographic categories. This results in the examination of 16 subgroups, which are applied to each of the five subject areas. The eight sociodemographic categories are:

1. Income (below \$50k vs. above \$50k)
2. Education (no college started vs. some college+ above)
3. Employment (not full-time employed vs. full-time employed)
4. Hispanic (Hispanic vs. non-Hispanic)
5. Nonwhite (white vs. nonwhite)
6. Migration (childhood in the United States vs. childhood outside of the United States)
7. Age (below 35 years vs. above 35 years)

8. Gender (males vs. females, shown separately from age category)

For each of the five subject areas, a summary table has been created which shows which of the two subgroups has the higher pro-transit position: Tables 1-5 are presented at the end of this Technical Appendix.

1. PREFERENCES FOR COMMUNITY

VARIATION BY AGE AND GENDER

The Extent to which the Millennial Generation is Interested in Urban Lifestyles

Individuals under the age of 35 are more inclined to prefer to live in urban areas than those over 35, with a low point occurring between ages 50 and 64. An analysis of variance revealed no significant difference between genders on this attitude, as summarized in Table 1, presented at the end of this section.

Urban, Suburban, and Rural

-
- *Most Millennials would prefer to live in the suburbs rather than in the city*
 - *However, of those preferring to live in the city, Millennials are the largest group*
 - *Millennials would like to live in a bigger house, and would drive long distances to get there, as would Hispanics, nonwhites, and those who have never gone to college.*
-

When asked to choose about their ideal location over three options, (Figure 1) individuals between 18 and 34 years of age express *a clear preference for the suburban community*, over the other options. (No further definition of the three categories was provided in the questionnaire, to minimize bias in the survey.) This pattern of suburban preference is stronger for those in the 25–34 category than for any other age grouping (although similar to the suburban preference of the 65+ group.) Those in the two younger age categories have a markedly lower preference for small towns and rural areas than do individuals in age categories over 35. Figure 2 shows the preferences of five age categories for living the three alternative residential location types. Within each age category, preferences can be observed. The suburban setting is preferred over other land types by all age categories under age 50.

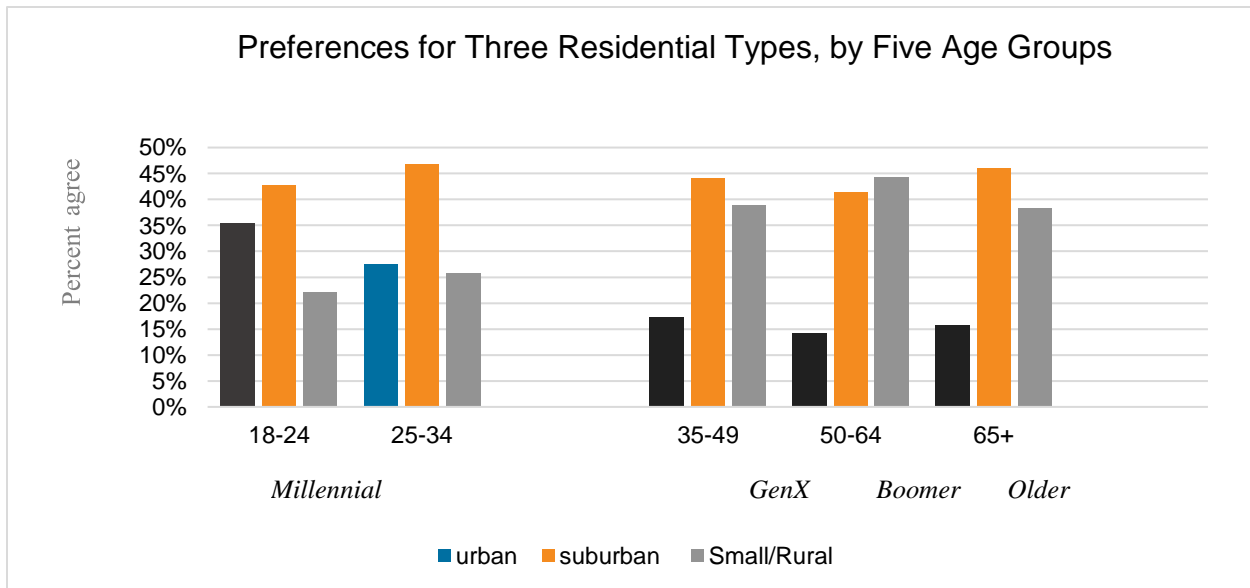


FIGURE 1. PREFERENCE FOR IDEAL RESIDENTIAL LOCATION, BY AGE CATEGORY.

Figure 2 shows the same data (same bars), but it is organized by three categories of settlement patterns. The “urban” settlement pattern shows that the younger age categories are far more likely to define urban as their ideal community than are the older age categories (with a slight increase for those over 65). With increasing age, preference for small towns and rural settings increases, with a “peak” at 50–64 category. No consistent variation of selection of “suburban” exists with increasing age.

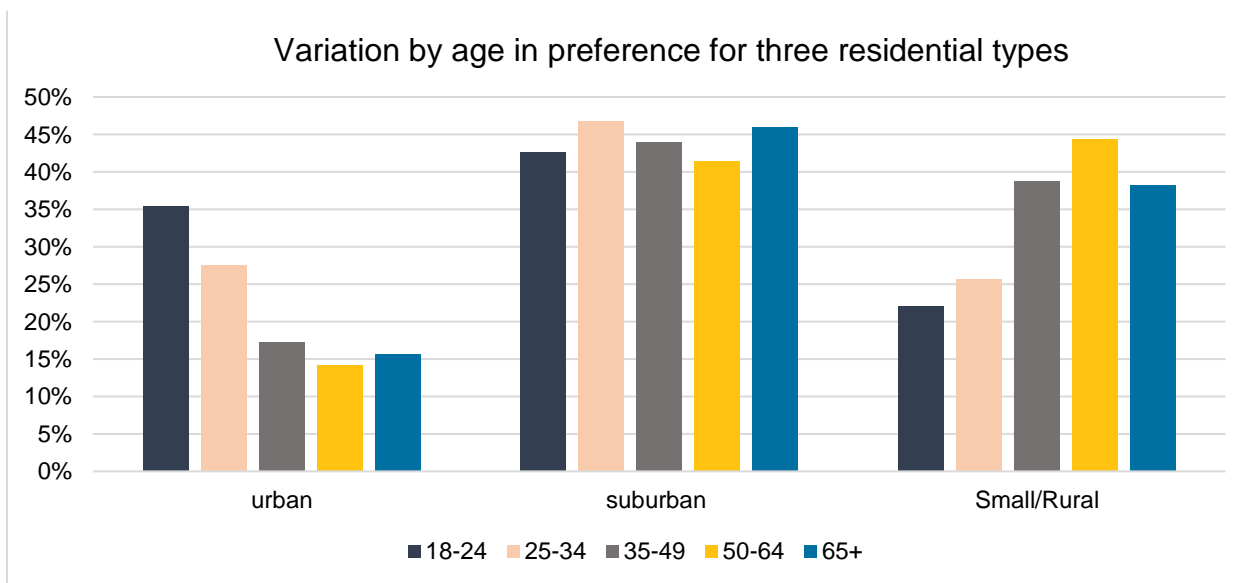


FIGURE 2. EFFECT OF AGE CATEGORY ON PREFERENCE FOR THREE TYPES OF IDEAL COMMUNITY.

Preferences for Community Characteristics

Figure 3 shows that individuals under 35 years of age are more likely to agree with the idea of wanting to live in a community where people interact in public. In every age category, women have a higher propensity to agree that this community characteristic is important.

People and Activity

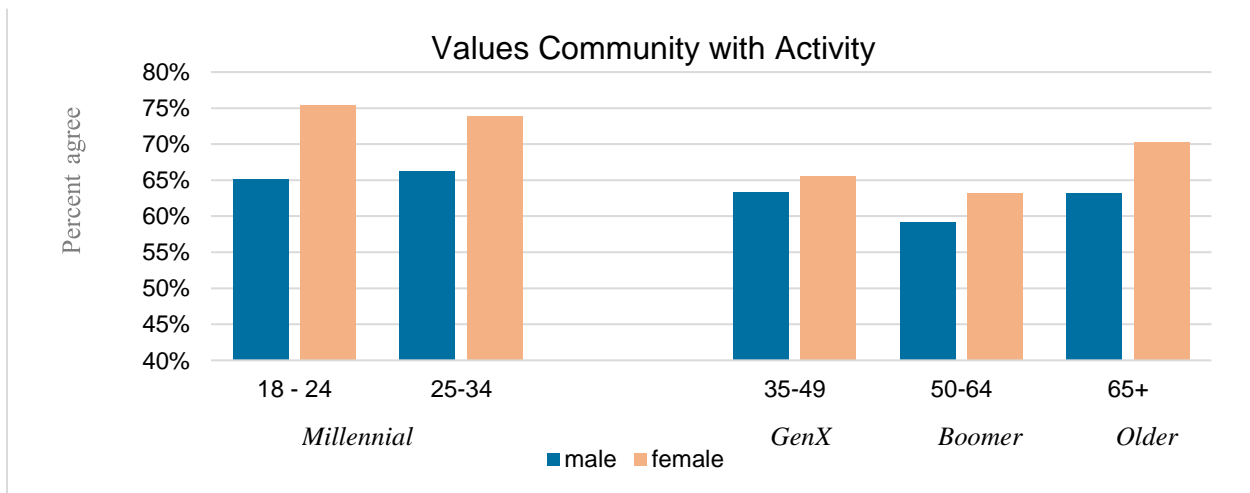


FIGURE 3. PREFERENCE FOR LOCATION WHERE PEOPLE INTERACT IN PUBLIC, BY AGE AND GENDER.

Figure 4 explores another aspect of “urban” values: the attitude toward living with a mix of people, rather than in a homogenous residential setting. Again, the agreement with this value is highest among the young, descending to the 50–64 age group, with a small rebound seen in those over 65 years of age. As revealed Table 1,(at the end of this Appendix) the higher level of agreement among women than men was found to be statistically significant.

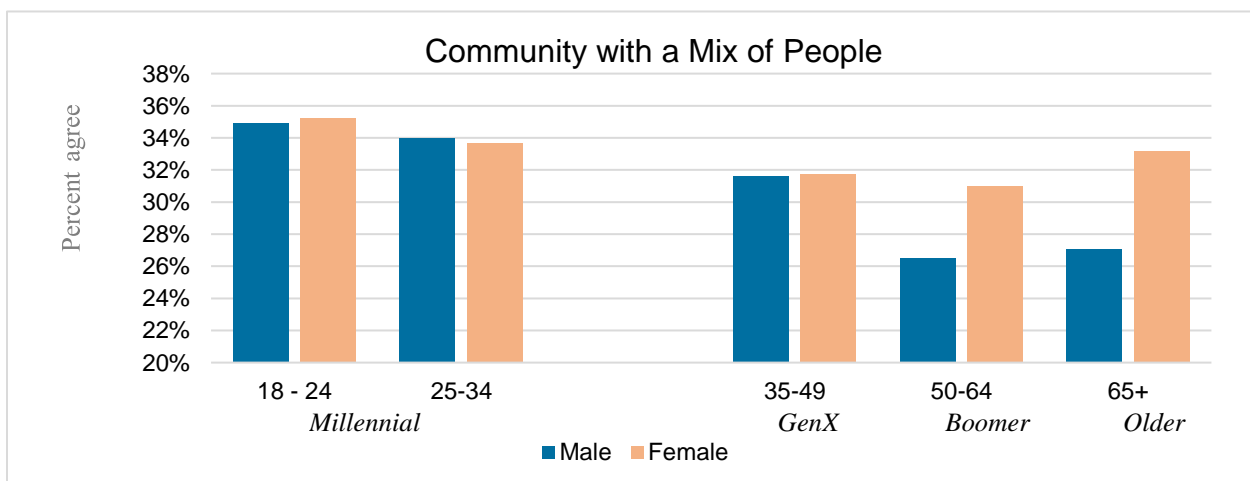


FIGURE 4. PREFER COMMUNITY WITH A MIX OF PEOPLE, BY AGE AND GENDER.

Distances/Proximity

Preference for a community within walking distance to stores and services is strongest for the youngest groups, with lowest preference for those between 35–49 years of age, with a rebound for those above 50 years of age, as shown in Figure 5. The importance of school quality in the selection of the residential location seems to peak in the 25–34 age category, with markedly less interest in the subject for those over 50 years of age, reflecting personal needs (not shown.)



FIGURE 5. PREFER TO LIVE WITHIN WALKING DISTANCE TO ACTIVITIES, BY AGE AND GENDER.

Figure 6 shows that Millennials are more likely to state that access to public transportation was a consideration when choosing the location of their home, with the 50–64 age group having the lowest propensity to state this. For all age categories, rates of agreement are higher for women than for men. The level of agreement from women over 65 is noteworthy.

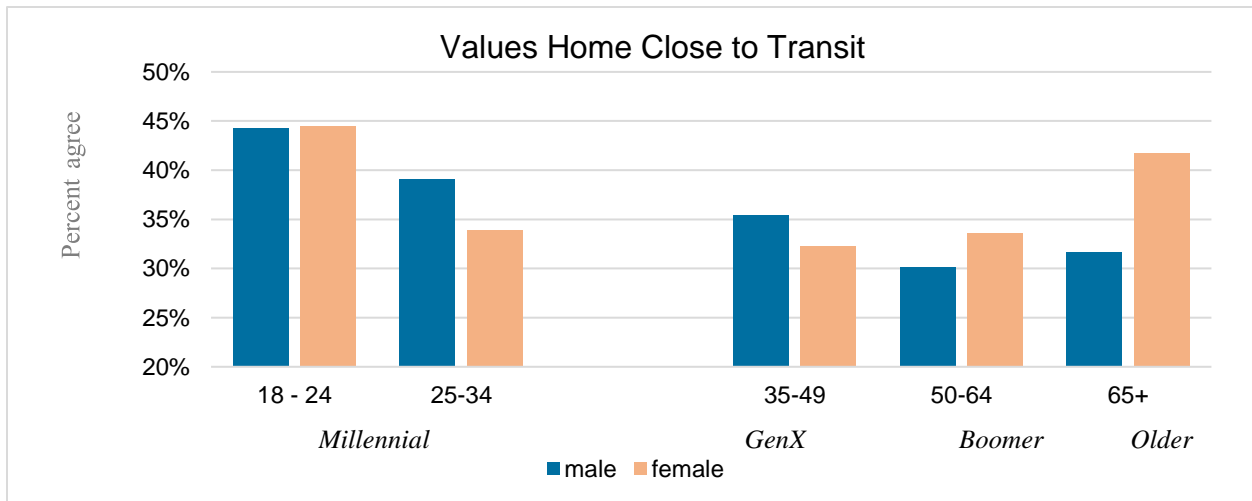


FIGURE 6. PREFERS HOME LOCATED NEAR TRANSIT, BY AGE AND GENDER.

Preferences for House Characteristics

Although Millennials prefer the suburban setting more than the urban setting, the importance of a large lot in their residential selection is lower than for middle-aged respondents, as shown in Figure 7.

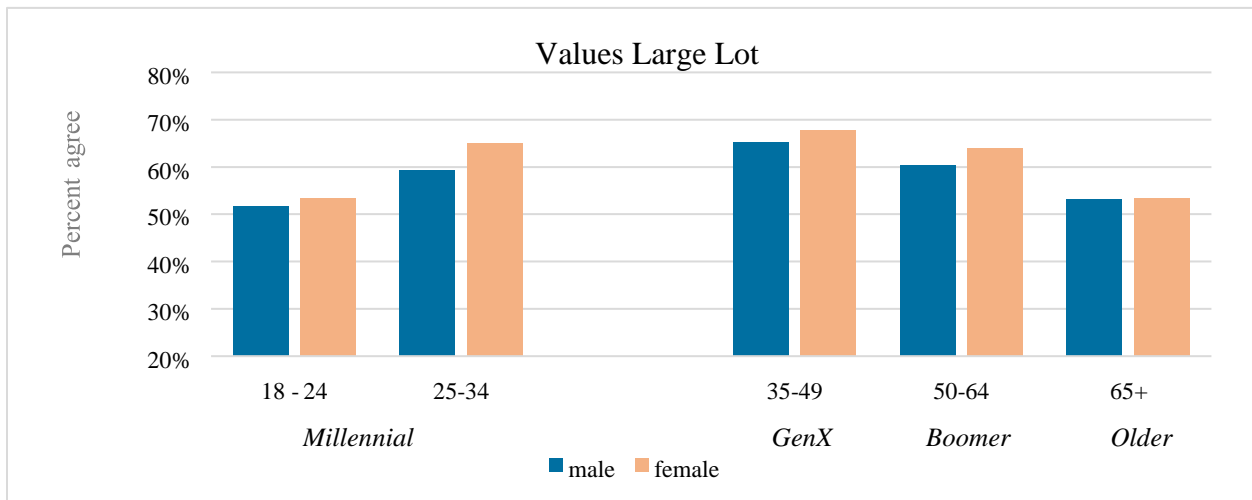


FIGURE 7. LARGE LOT AS A FACTOR IN CHOICE OF PRESENT LOCATION, BY AGE AND GENDER.

The desire for a larger home peaks near age 34 (Figure 8), while the desire for a large lot continues into middle age (Figure 9). A strong age component is associated with this preference, as those in the younger categories are starting with smaller residences, leading to a greater desire for more space. Regarding the desire for a larger home, women had a higher interest level (at 43%) than men (at 38%).

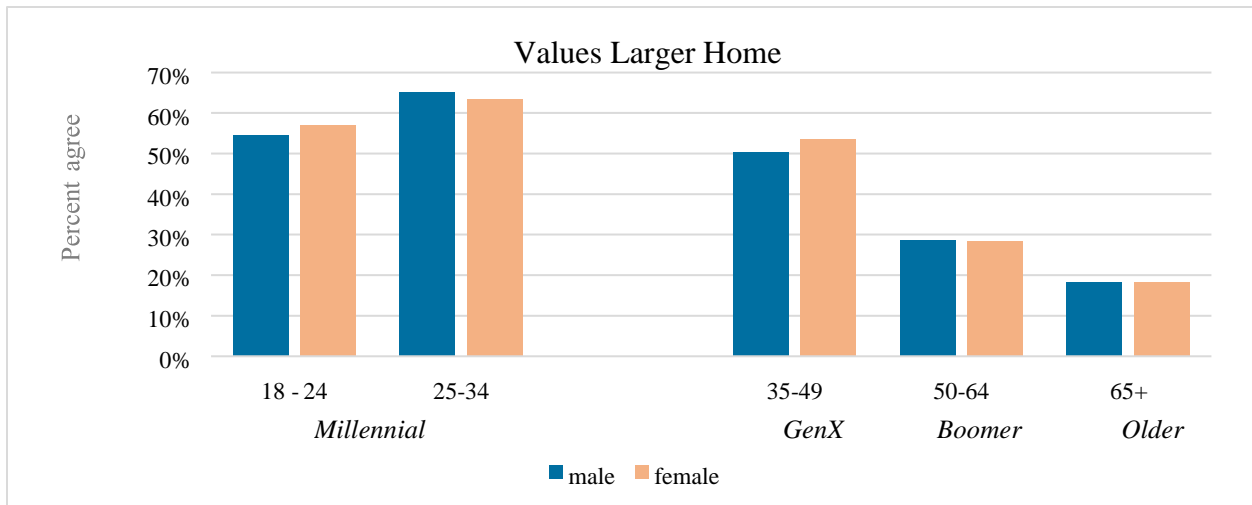


FIGURE 8. SIZE OF HOME IN CHOICE OF PRESENT RESIDENCE, BY AGE AND GENDER.

In terms of urban attitudes and preferences, younger respondents have a lower interest in having a private home with adequate separation from others, as shown in Figure 9. The higher level of concern for suburban spacing seems to reflect the actual settlement patterns of the age groups. No statistical difference was revealed between men and women.

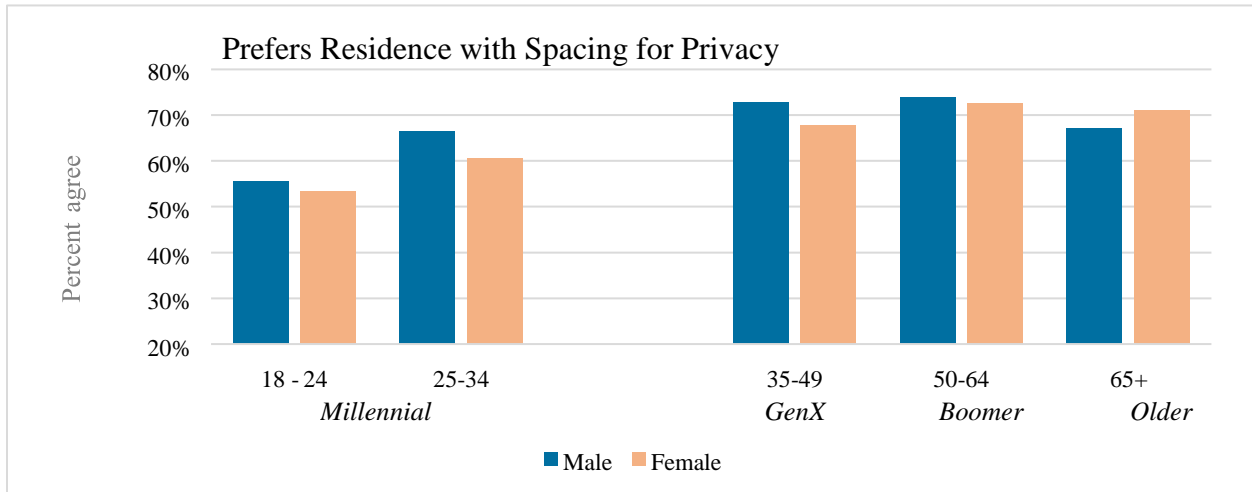


FIGURE 9. VALUES SUBURBAN SPACING AND PRIVACY BETWEEN HOMES, BY AGE AND GENDER.

Commute Distance and Trade-Off

Figure 10 shows that the importance of a short commute as a factor in residential selection was strongest between ages 25–49, with less importance by age 50. As age increases, both men and women experience something of a “bell-shaped curve,” with the peak occurring between 25 and

49 years of age. The desirability of the short commute was more important for women, with 61% agreeing, compared to 51% of men.

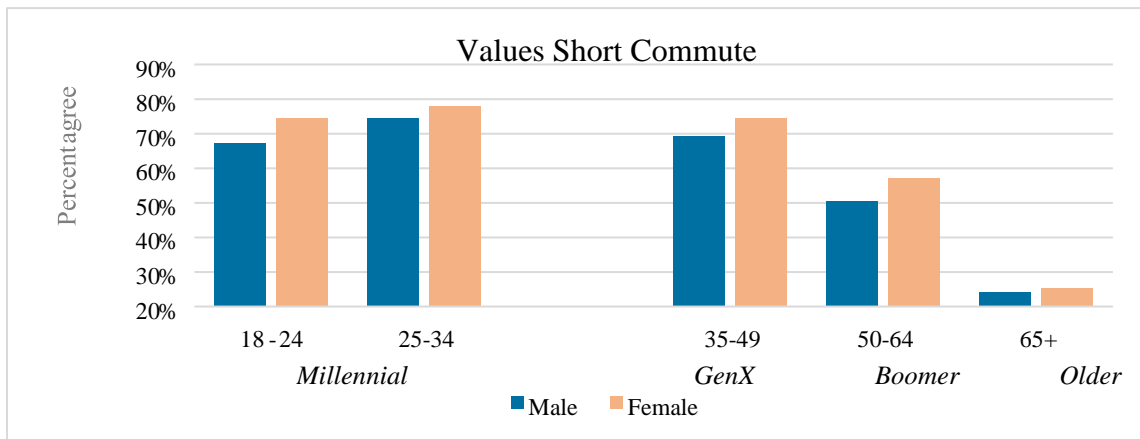


FIGURE 10. CLOSENESS TO JOB OR SCHOOL, AS A FACTOR IN CHOICE OF PRESENT HOME, BY AGE AND GENDER.

Ultimately, a trade-off exists between the common desire for a larger home, and the additional travel it might take to get to an affordable residential location. Under one possible hypothesis, one might assume Millennials would be *less* willing than other groups to drive farther to jobs to obtain a larger house; however, this hypothesis is not supported by the results presented here. Figure 11 shows that individuals under 35 have a *greater* willingness to commute longer for a bigger house, and this willingness steadily declines with age linearly for both genders. The younger groups seem less fazed by the idea of the additional drive if it serves to accomplish a desired end-state of the larger house. This may be because they have not experienced this long drive yet, while older people have. Women had a *slightly* higher willingness to drive farther than men, with a difference that is statistically significant.

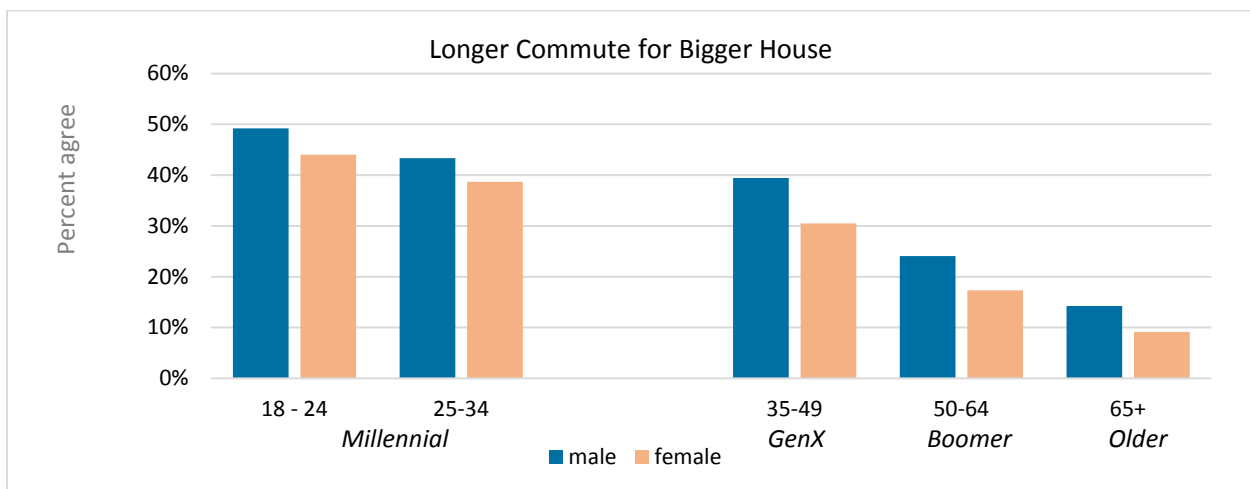


FIGURE 11. RESPONDENT WOULD DRIVE 45 MINUTES TO OBTAIN A LARGER HOME, BY AGE AND GENDER.

PREFERENCES FOR COMMUNITY: VARIATION BY EIGHT SOCIODEMOGRAPHIC CATEGORIES

Income, Education, and Employment

Individuals making less than \$50,000, the low-income subgroup, tend to have more preferences supportive of traditional transit services than the higher-income subgroup. The exceptions to this are that people in the low-income subgroup tend to want a larger home, and place less value on a community with lots of public interaction. There were no statistical differences between the two groups on preferences concerning a community with activities nearby (shorter commutes) nor a community with a wider mix of people, nor for the willingness to travel longer for a bigger house.

Having a higher level of education (defined as the subgroup who had received at least some college education) was associated with higher levels of preferences for pro-urban conditions, except for their desire for a large house lot. No significant level of difference was found between the two groups in terms of proximity to transit service, nor to reporting that the ideal community was urban. Those with some college were *less* likely to want to drive longer for a bigger house.

Pro-urban, pro-density attitudes are held by those with full employment, as reflected in their desire for short commuting distances, not needing a large home, enjoying being active, and reporting that urban is their ideal neighborhood form. On the other hand, full employment is also associated with wanting a bigger lot, not valuing transit proximity, and being willing to drive longer to get a bigger house.

Race and Ethnicity and Origin

In the analysis of attitudes consistent with higher density and more urban settlement patterns, nonwhites rank higher on most such pro-urban values than whites. According to Table 1 this is true for each of the survey questions, except issues about a big house and the propensity to drive farther for a bigger house. On the question of preferring a big lot, there was no statistical significance in the difference between the two subgroups.

Like the findings for nonwhites, being Hispanic was associated with more with more pro-urban preferences than not being Hispanic, except for a preference by Hispanics for a bigger house, and their willingness to have a long commute to attain a bigger house. No statistical difference was found for preference for a bigger lot between the two groups.

The group that spent its childhood outside of the United States had community preferences that were supportive of traditional transit, yet that group still has a desire for a larger house. Lack of statistical difference was found about having a large lot and being willing to travel farther for a big house.

Age and Gender, Separately

Table 1 shows that individuals under 35 have a higher consistency with the patterns supportive of public transportation and dense urbanism, with two exceptions. First, Millennials have a higher

propensity to report that they want a larger home than members of the older age groups. However, response to this question reflects upon the condition that each group is experiencing: the younger subgroup, living in small dwelling units, might logically give a higher rating to a large house than the older subgroup.

Second, Millennials reported a higher willingness to commute for 45 minutes to gain a larger house. This is somewhat inconsistent with a blanket assumption that Millennials have turned away from reliance on the automobile. However, it is somewhat consistent with the preceding observation, which notes that the younger of the two age categories are more likely to desire larger housing than their current housing.

In the analysis of attitudes supportive of higher density and more urban settlement patterns, women rank higher on most of the pro-urban values than men. According to Table 1 this is true for each of the survey questions *except* issues about a big house and big lot, where women reveal a greater desire for a big house and a big lot than men. On the question of naming urban areas as the “ideal” community, there was no statistical significance in the difference between the two subgroups.

Summary: Residential preference. Preference for residential locations is a complex issue and is inappropriate for a quick, linear summarization. For example, women tend to value highly urban conditions more than men, but they tend to value the (suburban) condition of a larger home and larger lot more than men do. While the younger group has more support for urban densities, they would like to live in a bigger house, and would be more willing than other age groups to drive a long distance to it! Nonwhites and Hispanics tend to prefer to live in a larger home more than whites and non-Hispanics and are more willing to have a long commute to attain a bigger house. The idea that many groups would like pro-urban densities *and* want a larger home is worthy of further research.

2. AUTO ORIENTATION AND DEPENDENCE

The belief that one is less dependent on the auto compared to their parents is stronger for the younger age categories

The youngest group reports using a friend's car four times more often than older groups

The younger groups are far more open to sharing a vehicle than the older groups, with no variation attributable to gender

VARIATION BY AGE AND GENDER

The low rate of vehicle ownership by those between 18 and 24 years old is supplemented by a remarkably *high* propensity to borrow, or share, someone else’s vehicle, a pattern which decreases sharply in the older age categories. As shown in Figure 12, 23% of those between 18 and 24 years old report that they *do* have access to a vehicle—they just do not own or rent one. This observation may be contrasted with the age group of 65 and older, where almost no one (1%) reports such a pattern of borrowing.

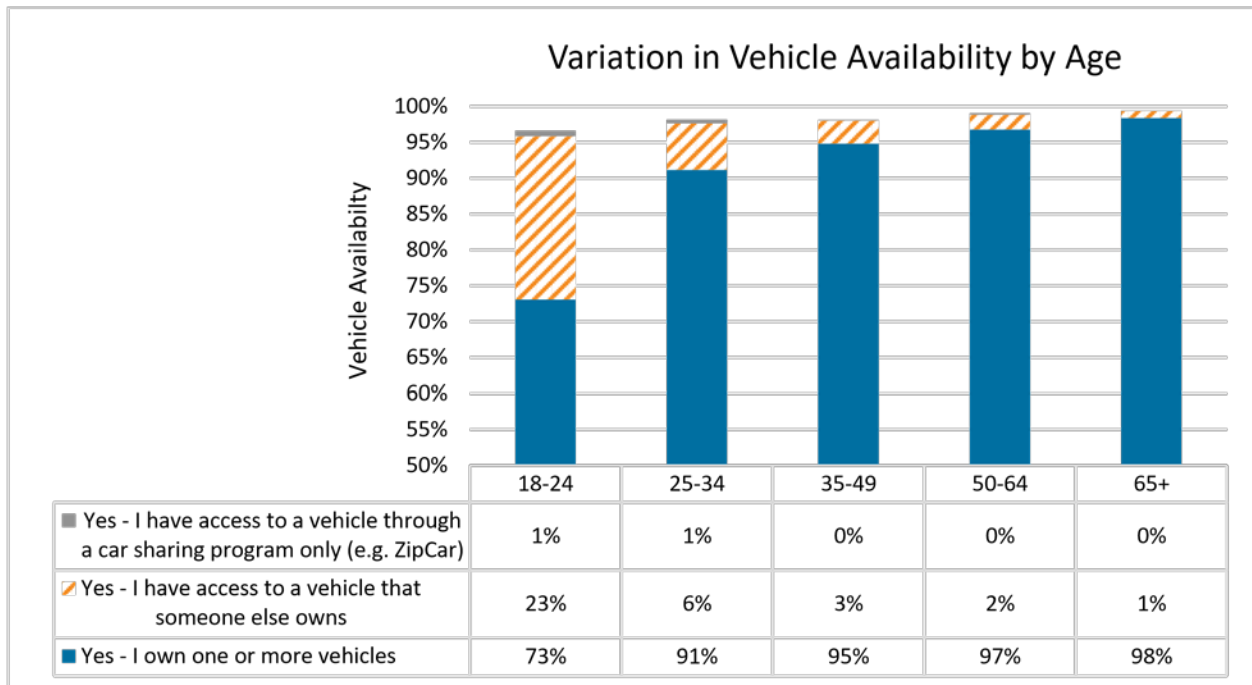


FIGURE 12. METHODS OF ACCESS TO VEHICLES, BY AGE

Availability/Ownership of Vehicle

There was variability by age for the existence of bike sharing schemes when looking at sharing programs within the community (as opposed to their actual use); however, there was less variability by age for the existence of car-sharing. Millennials are more likely to be in areas with sharing services 30% more than older groups (Figure 13).

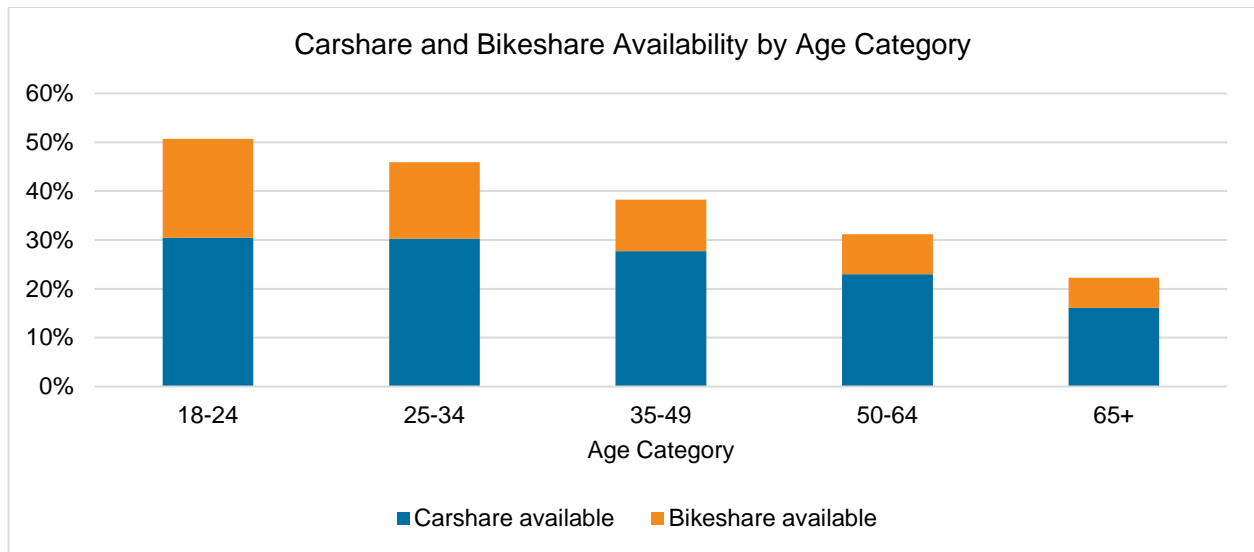


FIGURE 13. AVAILABILITY OF CAR SHARE AND BIKE SHARE, BY AGE.

“Sharing” an Automobile, Compared with Owning One

Figure 14 shows that a sharp division exists in the desire to participate in sharing programs; Millennials are far more positive about the concept than those over 50. No variation occurs between men and women. The propensity to agree with the concept that they like the sharing programs decreases with each category. The propensity to disagree increases with age.

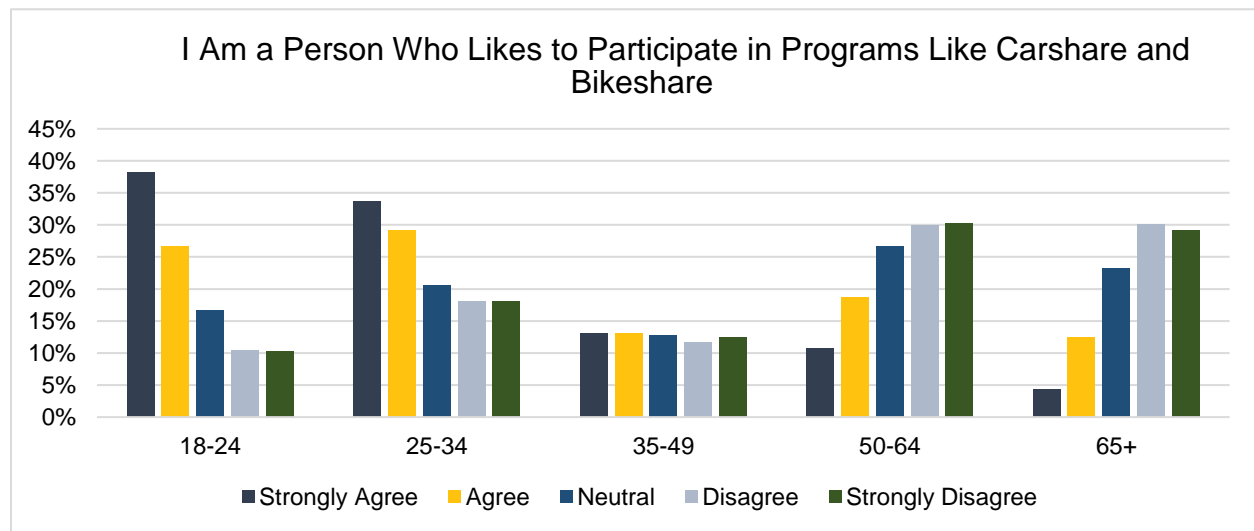


FIGURE 14. LEVEL OF AGREEMENT WITH LIKING TO PARTICIPATE IN SHARING PROGRAMS, BY AGE.

Rates of Holding a Driver’s License and Time of Acquisition

The age at which a young person obtains a driver’s license has changed considerably over time, but most individuals have a driver’s license by the time they are 25 years old. Fully 95% of those over 35 years old have a driver’s license, while fewer than 80% of those between 18 and 24

years old have one. Minor variation among men and women is reported through each of the age categories over 25 (Figure 15).

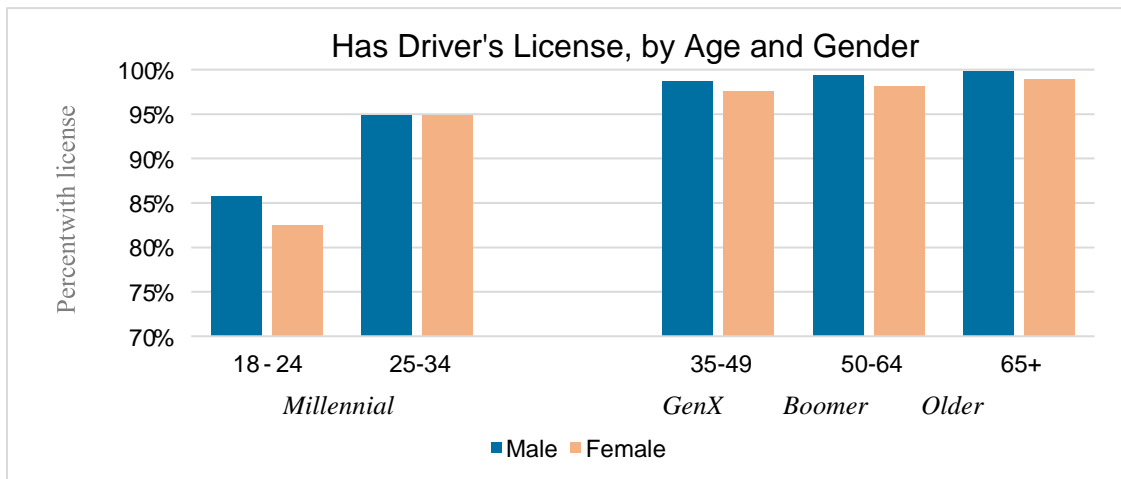


FIGURE 15. HOLDING DRIVER'S LICENSE BY AGE AND GENDER (INCLUDES ALL WHO HAVE ACQUIRED LICENSE)

Figure 16 shows that the plurality of those between 18 and 24 years old acquired their driver's license when they were 17 years old, while the plurality of all other age groups had acquired their license when they were 16 years old. The shift from the driver's license age of 16 to 17 is dramatic for the youngest age category, but the variation in other categories is not strongly related to age.

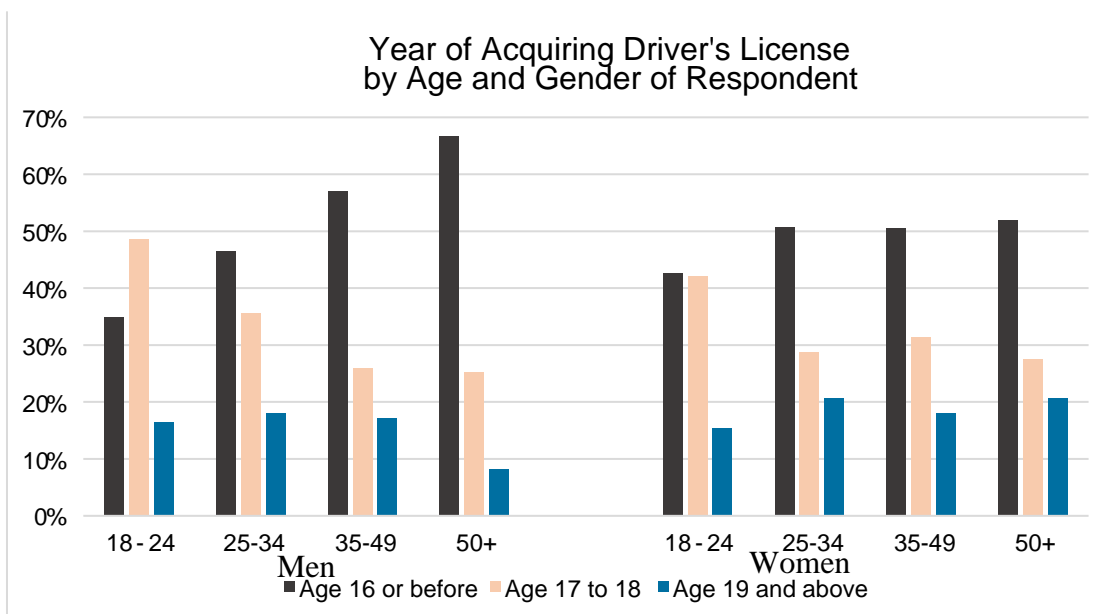


FIGURE 16. YEAR LICENSE WAS OBTAINED, BY PRESENT AGE OF THE RESPONDENT

Figure 17 suggests that young people's current adoption of transit may be unusual when viewed in an historical context. Those between 18 and 24 years old are the most likely age group to have tried transit before turning 18. The only age group that is nearly as likely to have done so is the 65+ category, suggesting a historic shift back to early adoption of transit.

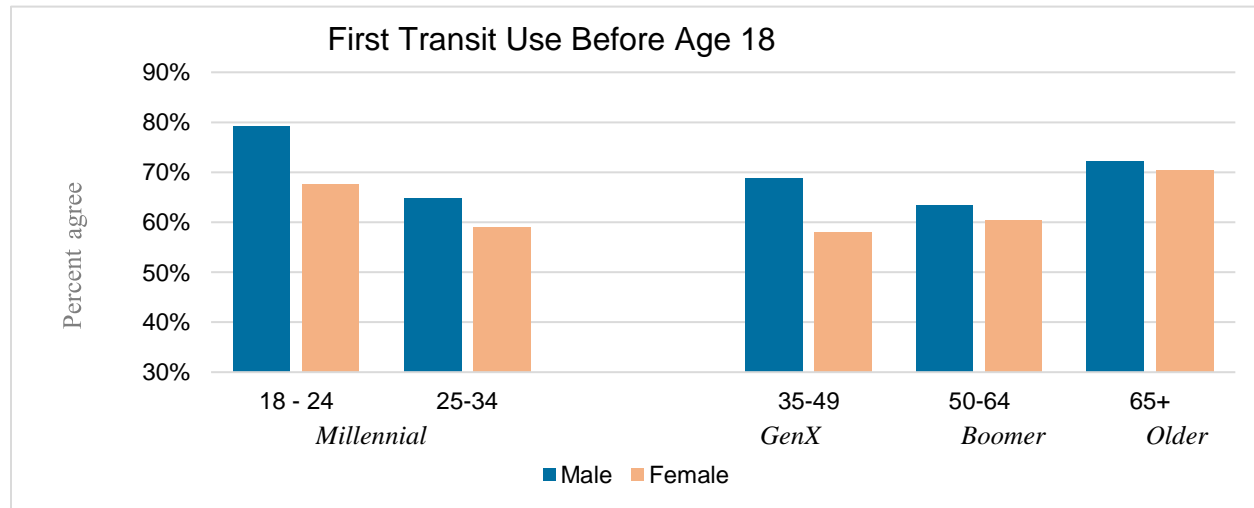


FIGURE 17. VARIATION IN TIME OF FIRST USE OF TRANSIT, BY PRESENT AGE AND GENDER

AUTO ORIENTATION AND DEPENDENCE: VARIATION BY EIGHT SOCIODEMOGRAPHIC CATEGORIES

Income, Education, and Employment

Individuals in the low-income subgroup, those earning less than \$50,000 annually, were more supportive of a lifestyle less dependent upon the automobile, when compared to the higher-income group. The lower-income group reported more support of lowered auto orientation and dependence in all eight of the survey questions examined, as shown in Table 2, presented at the end of this Appendix.

Similarly, the subgroup that had not finished college was more supportive of a lifestyle less dependent upon the automobile, when compared to the college educated subgroup. As shown in Table 2, the less formally educated subgroup reported more support of lowered auto orientation and dependence in six of the eight survey questions examined. There was no statistical difference between the educational subgroups in the other two survey questions examined.

Variation between the two employment subgroups was more mixed. The subgroup employed full-time was more associated with attributes of independence from autos based on a greater willingness to participate in sharing programs, a reported lower auto dependence than their parents, and a belief that their friends prefer to drive less. By contrast, the not full-time employed subgroup had more auto dependent preferences in terms of feeling of freedom, needing the car, preference to be the driver, and needing flexibility.

Race and Ethnicity and Origin

Hispanic and nonwhite subgroups were more supportive of a lifestyle less dependent upon the automobile. Compared to the Non-Hispanic and the white subgroup, Hispanic and nonwhite subgroups support lowered auto orientation and dependence in all eight of the survey questions examined.

Age and Gender, Separately

Millennials currently hold attitudes and preferences of lowered auto orientation and dependence than the non-Millennial subgroup in response to all the questions presented in Table 2. The empirical data support the popularly held generalization that those under 35 years of age have different attitudes about auto orientation and auto dependence than those over 35 years of age.

When there were significant differences between the genders, women always reported preferences that were consistent with a lifestyle with less auto orientation and dependence. However, Table 2 shows that there were five survey questions where the responses showed no statistically significant differences between the two subgroups.

Summary: Auto Orientation. Unlike the subject area of residential preferences, orientation toward the automobile seems to have some relatively clear-cut relationships with key sociodemographic variables. Of the eight statements we exposed our sample to, being under 35 years of age explains a pattern of independence from the automobile more than being older in each case. The same is true for making less than \$50k and for being nonwhite. On the other hand, gender seems to explain almost nothing in the subject area of auto orientation and dependence.

3. ENVIRONMENTAL CONCERNS

VARIATION BY AGE AND GENDER

Millennials are more likely than older groups to believe that environmental concerns are overblown, and less likely to want to pay taxes to fix environmental problems

Yet, at the same time, Millennials are more likely to express environmental optimism, and report that this would influence their choice of mode

Optimism and Motivation for Transit

Figure 18 helps us understand that gender may be a more important determinant of environmental optimism than age. Women have a higher level of optimistic belief about improving the environment than do men for all our age categories. For men, environmental

optimism peaks at early middle age, with a “bell shaped curve” up from the youngest category, and back down for the oldest category.

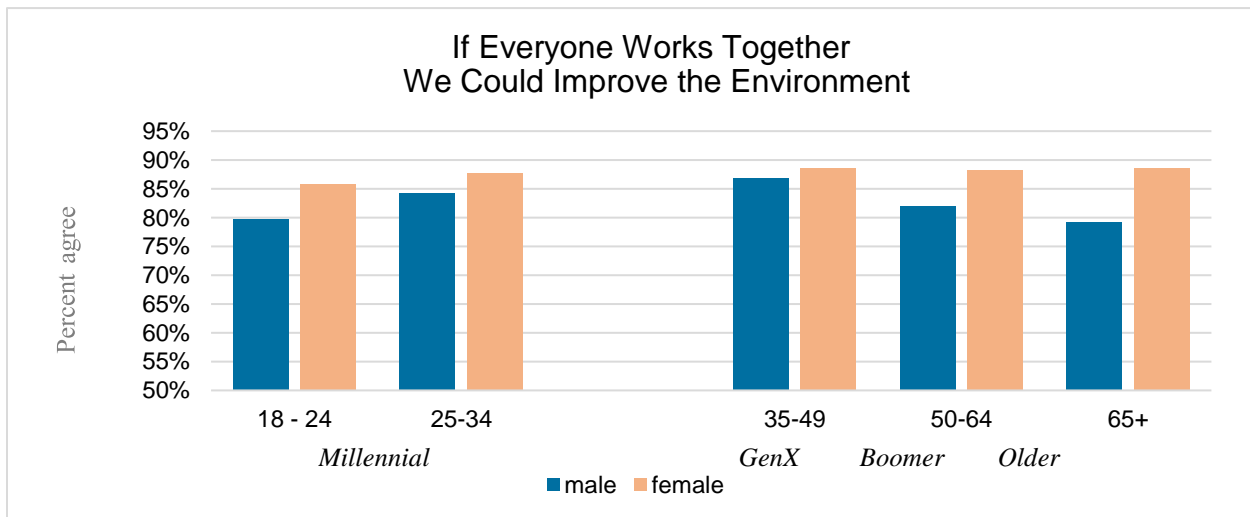


FIGURE 18. VARIATION IN ENVIRONMENTAL OPTIMISM, BY AGE AND GENDER

In regard to environmental commitment in the choice of mode, Figure 19 shows that the two younger groups are more likely to self-report that they do think about the environmental implications of their travel. Both men and women have a pattern of overall decrease in environmental consideration associated with an increase in age (although not all the differences are significant). Most interesting is the lack of propensity to report this motivation by those over 50 years of age, whose travel patterns may have become somewhat fixed. Generally, men under 50 years old all have about 35% agreement rate for each age category. Women under 25 years old have the highest propensity to report this motivation for mode choice.

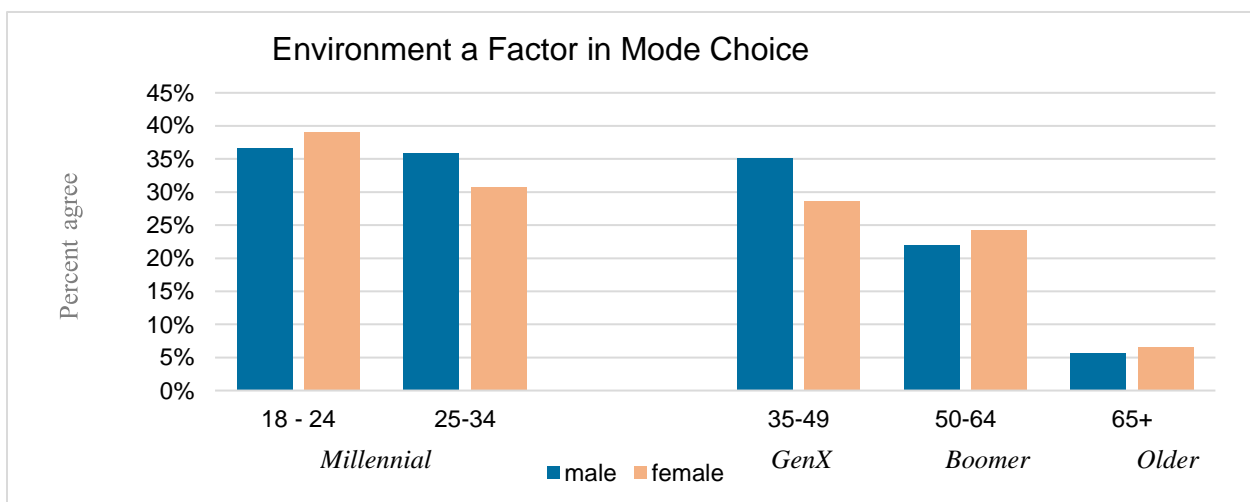
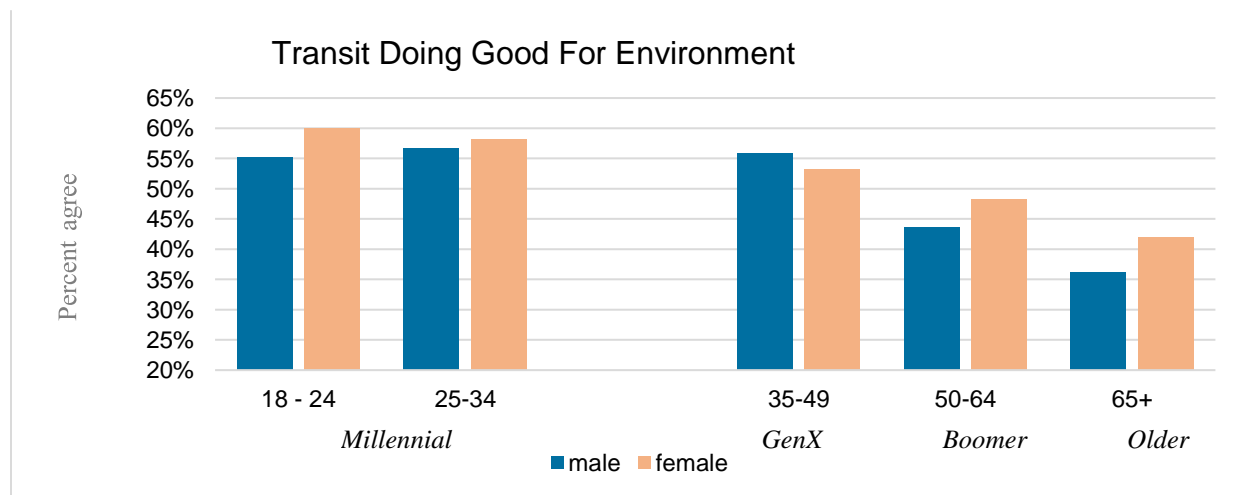


FIGURE 19. ENVIRONMENT STATED AS A FACTOR IN CHOICE OF MODE, BY AGE AND GENDER

Figure 20 concerns the question of doing “good” for the environment by riding transit. In it, men show minor variation (again) by age groups under 50, with lesser levels of positive feeling as they age. It is interesting that those over 65, who had extremely low propensity to report that their feelings would actually influence their behavior, had a much higher propensity to say they felt they were doing “good” by using transit, with their percent agreement more similar to other age groups than in the Figure 19. Good feelings about riding transit are highest for younger women.

**FIGURE 20. LIKE THE IDEA OF DOING GOOD FOR THE ENVIRONMENT BY RIDING TRANSIT, BY AGE AND GENDER**

The propensity for Millennials to say they like doing something good is similar in scale to the attitudes of the early middle age group (35–49), but higher than the two older age groups. In response to a similar survey question (“I would switch to a different form of transportation if it would improve air quality”), about 50% of Millennials agreed, while only about 30% of the older groups (combined) agreed. Women were more likely to agree (52%) with this sentence than men (46%).

Belief that Environmental Dangers are Overblown, or Expensive

Reversing the emphasis from the three preceding figures, the next two graphs explore dimensions of *skepticism* about environmental concerns. The first is most direct, in the statement that, “Environmental concerns are overblown.” Overwhelmingly, men are more likely to express this negative reaction than women.

For women, the level of agreement decreases directly with increasing income. For men, the pattern is more complex, with a high agreement with this negative statement for the youngest group of men, followed by a “u-shaped curve” in which environmental skepticism decreases with age to the “Gen Xers” and then increases again for the 65+ group. The high level of

negative sentiment on this issue from the 18- to 24-year-old men is important in the analysis of possible future scenarios.

Figure 21 shows that the youngest group (18–24) has the highest level of doubt about the legitimacy of environmental concerns. Those in early middle age (35–49) have the highest level of belief in the validity of environmental concerns. As a group, men were *far more* likely to doubt this validity (34%) than were women (21%).

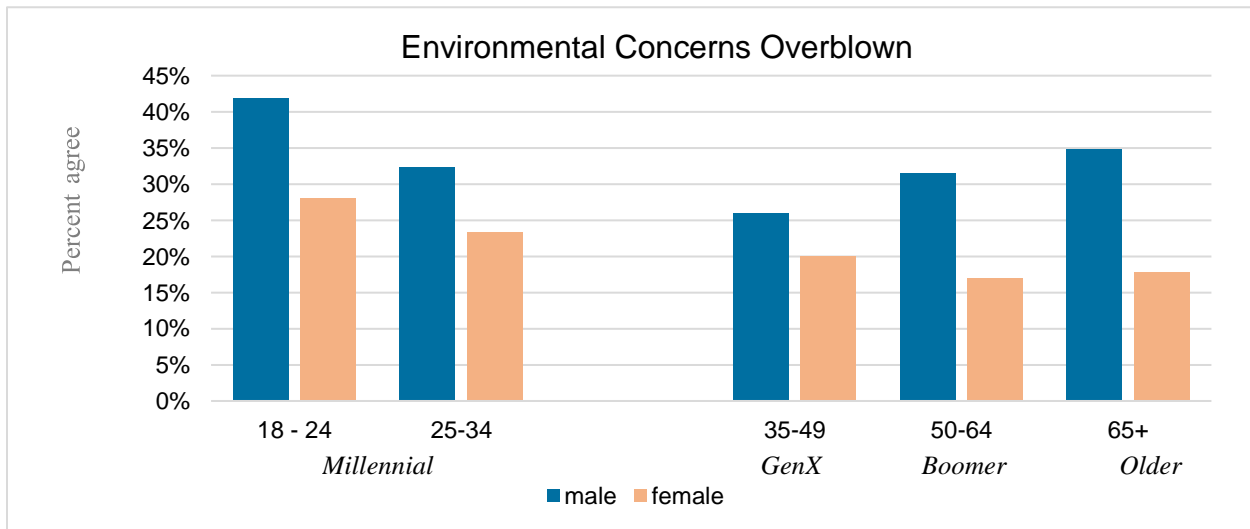


FIGURE 21. BELIEF THAT ENVIRONMENTAL CONCERNS ARE “OVERBLOWN,” BY AGE AND GENDER

Figure 22 shows that the pattern of younger people showing some level of skepticism about dealing with environmental concerns is not disproved when applied to the question of who should pay. No statistical difference was found between the two genders. Looking first at women, Figure 22 shows that concern about paying for the environmental improvement decreases consistently with age. For men, high levels of support (over 50%) for this skeptical position stay largely constant until age 50, at which point they decrease with age in a pattern like women. Overall, support for bearing such costs increases directly by increasing age category.

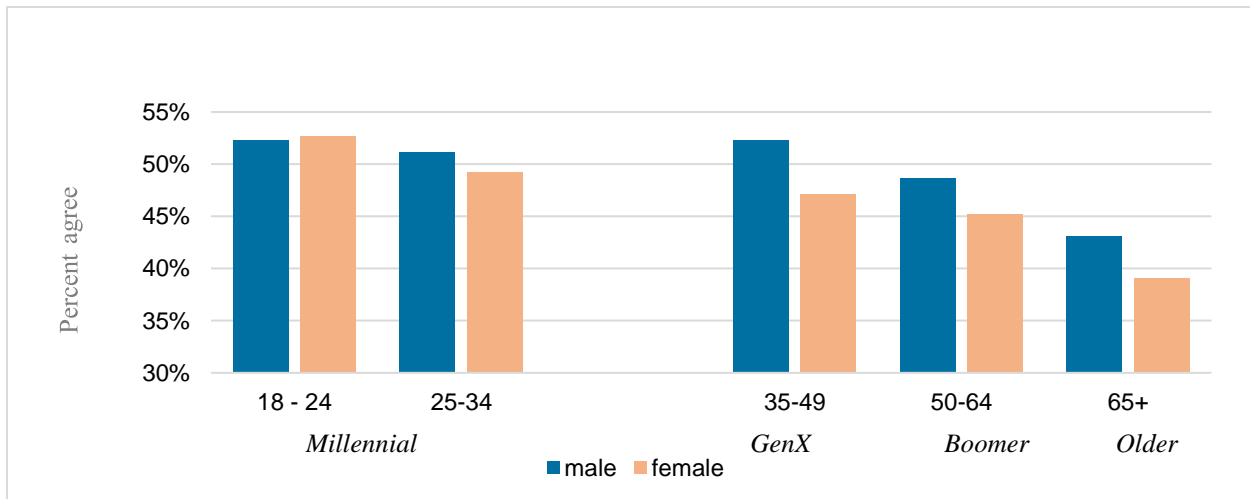


FIGURE 22. STATEMENT THAT IMPROVING AIR QUALITY SHOULD NOT “COST ME MONEY,” BY AGE AND GENDER
ENVIRONMENTAL CONCERNS: VARIATION BY EIGHT SOCIODEMOGRAPHIC CATEGORIES

Income, Education, and Employment

Income level seems to have a mixed relationship with environmental issues as shown in Table 3, presented at the end of this section. The high-income subgroup is more likely to agree that fixing environmental problems may indeed cost them money. On the other hand, the low-income subgroup is more prone to say that environmental concerns might influence their choice of mode. The low-income subgroup is less likely to believe that environmental concerns are overblown.

The more-educated subgroup likes the idea of doing “good” with transit and is more willing to pay for improving the environment. Other than in those two subject areas, level of education explains relatively little about pro-environmental attitudes. Having a full-time job increases one’s propensity to say environmental concerns would, and have, influenced one’s choice of mode. At the same time, the subgroup that is employed full-time is also more likely to believe that environmental concerns are overblown and to express an unwillingness to pay for environmental improvement.

Race and Ethnicity and Origin

Patterns explaining environmental attitudes are not consistently explained by racial or ethnic subgroups. Whites are more inclined to reject the idea of environmental danger being “overblown,” and are more willing to pay for improvements. Nonwhites are more likely to report that environmental concerns have influenced their mode choice and will continue to do so; nonwhites are more likely to show optimism that we could work together to improve the planet. Hispanic ethnicity also has a mixed relationship with environmental commitment. Hispanics are more likely to say the environment has influenced their mode choice and will continue to do so.

However, Hispanics are also more likely to believe that environmental issues are overblown, and less willing to pay for an improvement.

Age and Gender, Separately

Millennials have stronger pro-environmental beliefs than the older group in four subject areas, but not in the other two. Table 3 shows that Millennials *did not* have the stronger proenvironmental view concerning the belief that environmental concerns are “overblown” nor in the question of who should pay for the improvement of the environment.

Summary: Environmental Concern. In general, demographics do not help much in the explanation of attitudes toward the environment, or at least do not consistently explain attitudes toward the environment. Women and those raised outside of the United States are more likely to report an interest in the environment than are men, but not always. Perhaps most relevant is the question concerning the subgroup’s intent to switch modes to improve air quality, where the pattern reflects the larger pattern of pro-transit behavior by those outside of the mainstream (i.e. Nonwhite, younger, and Hispanic). Interestingly, the willingness to switch modes to improve air quality is not seen in the subgroup that is employed less than full-time but rather in the subgroup that is employed full-time. This data presented here is largely consistent with a broader pattern in the literature which concludes that even those with strong pro-environmental positions do not necessarily base their transportation behavior on these beliefs.

4. CONCERNS FOR PRIVACY, SAFETY, AND CRIME

Millennial women report higher levels of worry about crime in transit than other groups.

Millennials of both genders agree more that “It Would Be Easier for Me to Use Transit More If I Were Not So Concerned About Traveling with People I Do Not Know” than older groups.

Millennial men report high level of feeling safe on transit, while Millennial women do not.

VARIATION BY AGE AND GENDER

Concerns about Privacy in Travel

Little variation by age exists in the importance of attitudes about privacy in metropolitan tripmaking, with over 60% of every group expressing a concern (Figure 23). No gender-based difference was found for the “privacy” concern; women were neither more nor less likely to state this importance than men. Statements that a universally valued attribute are “important” seem to

reveal minor variation in terms of these two demographic categories. If any pattern is apparent, it would be a modest “bell-shaped curve” in which those at early middle age (35–49) are at the peak of the curve.

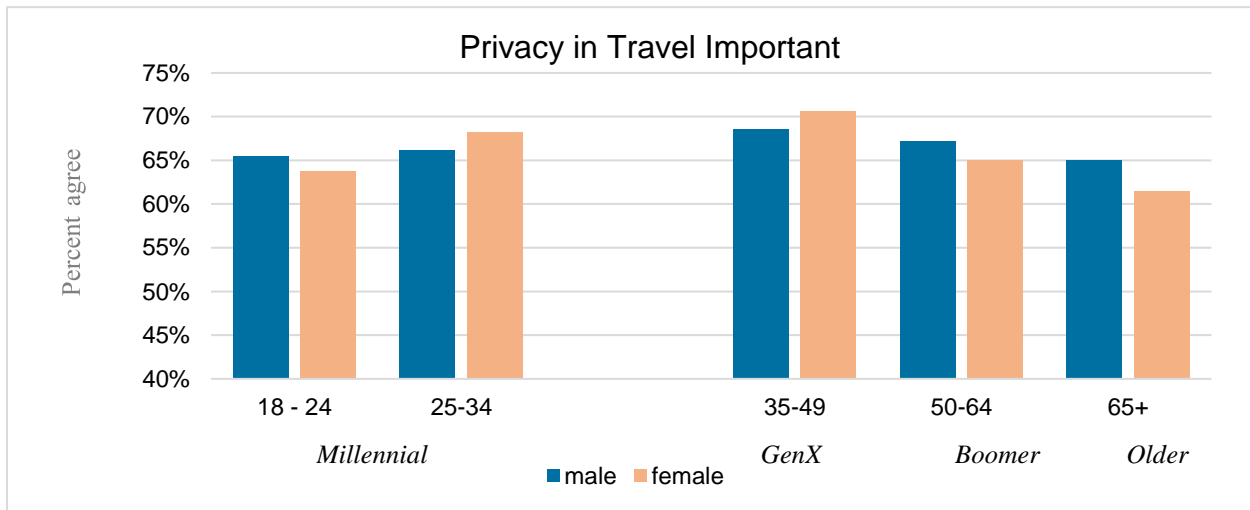


FIGURE 23. AGREEMENT THAT PRIVACY IS IMPORTANT TO ME IN TRAVEL, BY AGE AND GENDER

Personal Safety, Crime, and Disturbing Behavior

From Figure 24, concern for “personal safety” seems to be higher for respondents older than 35 than for younger ones. Looking at gender overall, 88% of women reported a concern with personal safety, compared with 81% of men.

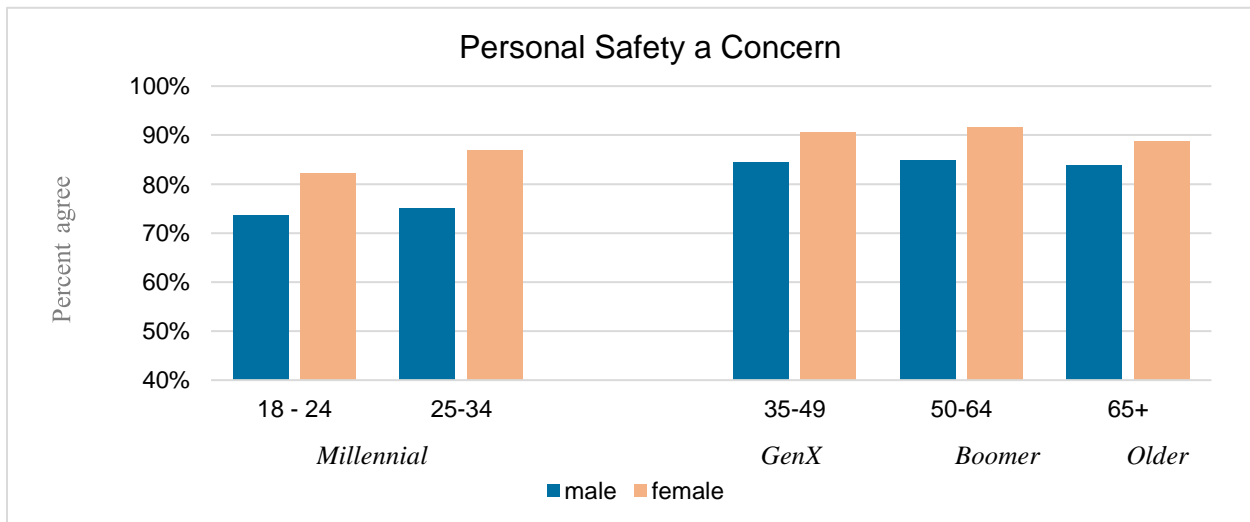


FIGURE 24. AGREEMENT THAT PERSONAL SAFETY IS A CONCERN IN TRAVEL, BY AGE AND GENDER

As shown in Figure 25, Millennial women report that they worry more about crime on public transportation than any other group. Concern about crime on transit seems to fall with age for

men; for women, concern is higher for Millennials than for the older age categories. Most respondents under 65 years of age stated a concern about crime and other disturbing behavior on public transportation.

RESPONDENT WORRIES ABOUT CRIME ON PUBLIC TRANSPORTATION TRIP, BY AGE AND GENDER

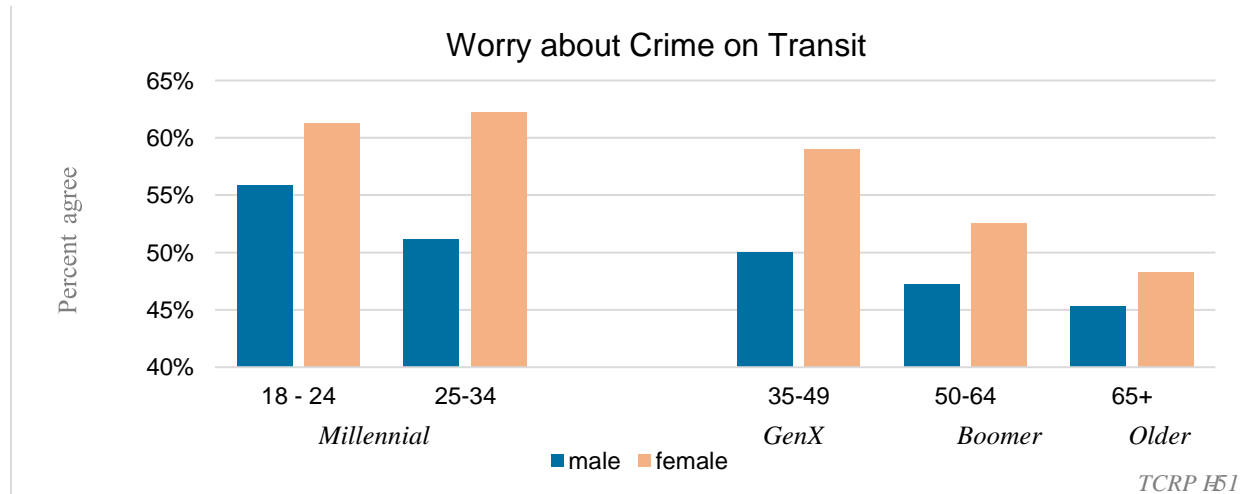


FIGURE 25. CONCERN WITH CRIME AND DISTURBING BEHAVIOUR ON TRANSIT, BY AGE AND GENDER

With a minority of all groups reported that they feel safe on public transportation, feeling safe decreases with age. And, in each age group, differences between genders are strong: while 56% of women reported worrying about crime (Figure 25), only 49% of men were concerned. Similarly, 42% of men reported feeling safe (Figure 26), while only 33% of women reported feeling safe.

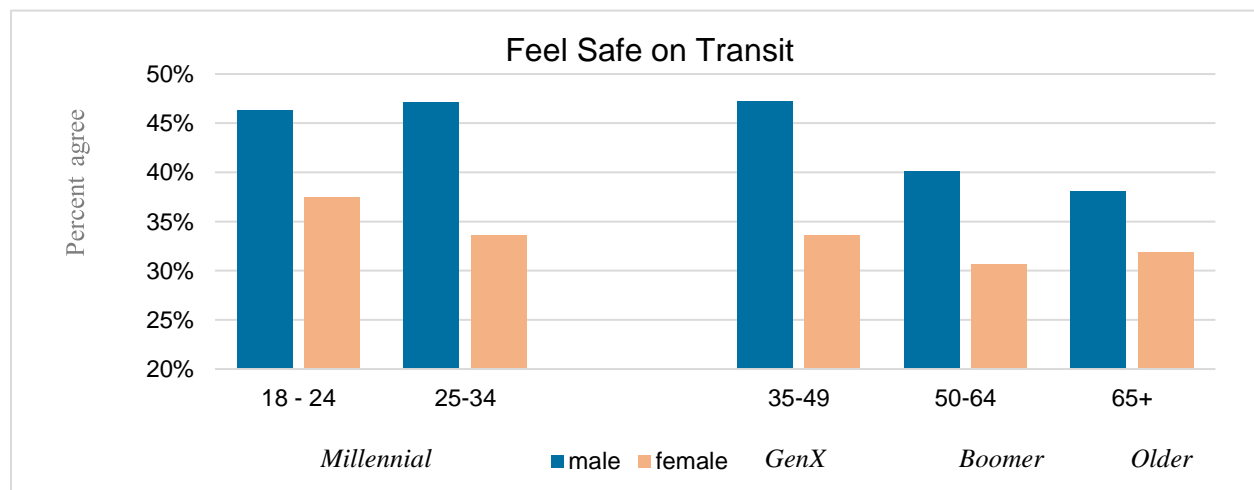


FIGURE 26. RESPONDENT FEELS SAFE ON PUBLIC TRANSPORTATION TRIP, BY AGE AND GENDER

When similar concerns were explored in different terms in the survey, concern for the issues of traveling with people they do not know varied sharply by age group, this time with the youngest expressing the most concern, as shown in Figure 27. This sentiment was expressed by 24% of women and 20% of men, a difference which was statistically significant.

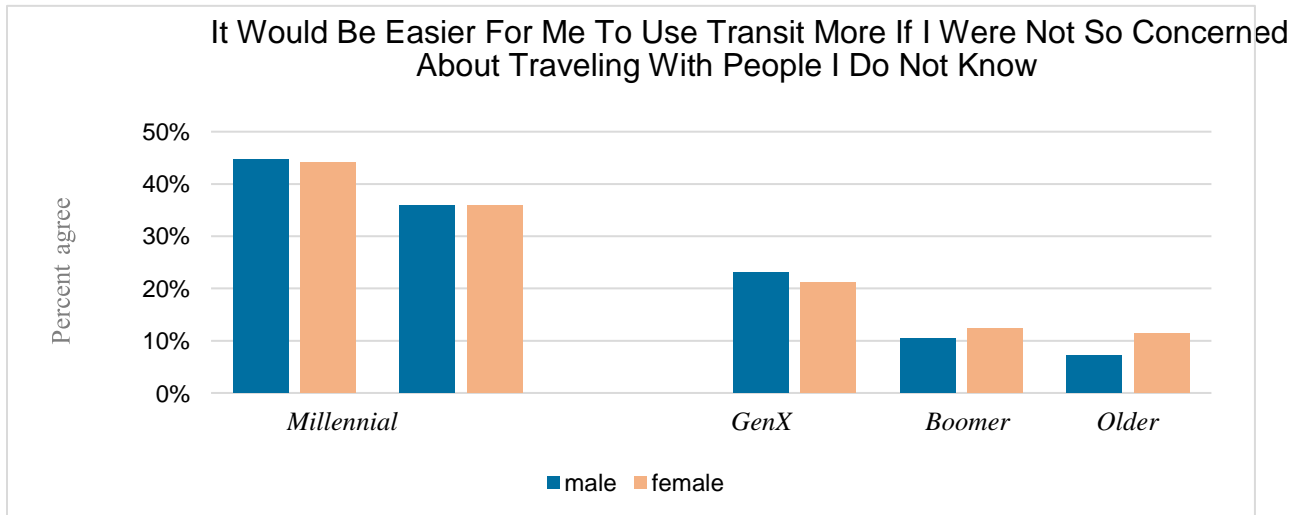


FIGURE 27. CONCERNED ABOUT RIDING WITH PEOPLE ONE DOES NOT KNOW, BY AGE AND GENDER

Concern for safety and security is reflected in Figure 28, taken from a set of survey questions reported more completely below about how to make transit service better. In terms of the role of age, as age increases, the respondent is *less* inclined to say that any given improvement would result in greater transit ridership. It is clear that safety at stations is more of a concern for women than for men. The youngest survey participants report the highest probability of increasing transit use if safety issues were addressed.

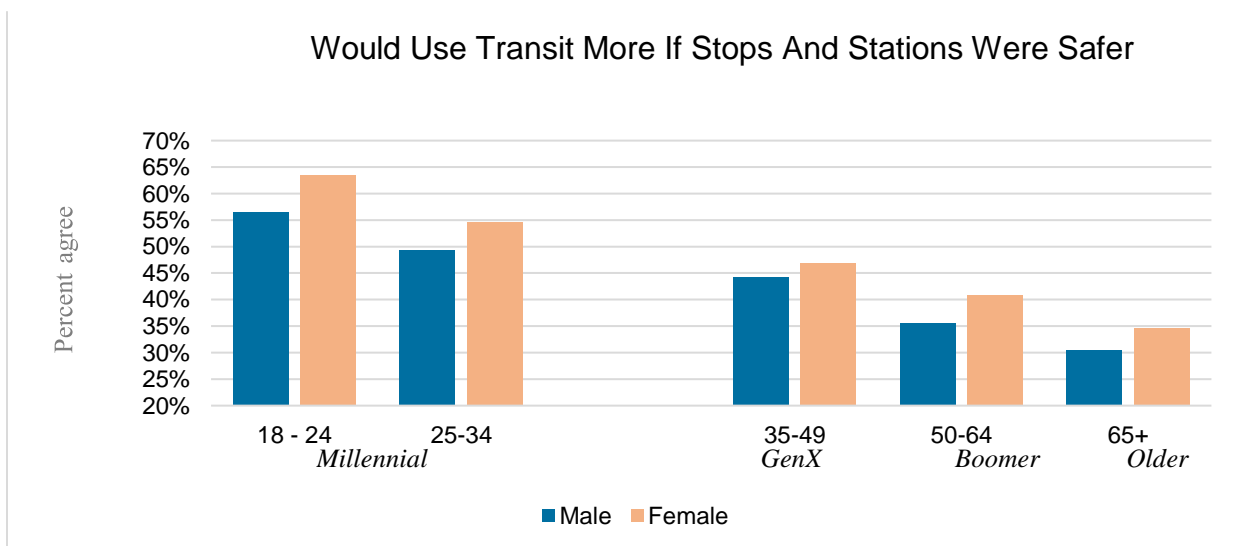


FIGURE 28. MORE TRANSIT USE IF STATIONS WERE SAFER, BY AGE AND GENDER

CONCERNS FOR PRIVACY, SAFETY, AND CRIME: VARIATION BY EIGHT SOCIODEMOGRAPHIC GROUPS

Income, Education, and Employment

A higher income seems to be associated with a lack of fear about the transit trip. Those in the high-income subgroup seem to be *less* worried about crime, traveling with people they do not know, feeling safe, and having privacy during the trip than those in the low-income subgroup. Those in the low-income subgroup would be more likely to use transit if the stations and stops were made safer, consistent with their greater concern about safety and crime, and possibly the neighborhoods they travel in.

A similar pattern exists for higher levels of educational achievement, as shown in Table 4. Those with more education are less likely to report a sense of worry or fear with transit. Those with less education are more likely to report unsafe stations as an issue affecting their potential greater use of transit.

Table 4 shows a mixed pattern within the category of employment: those without full-time employment worry less about traveling with people they do not know, and do not consider privacy to be important in the choice of mode. At the same time, the subgroup that works less than full-time is *more* worried about safety in travel and are more likely to report that more safety in stations would facilitate greater use of transit.

Race and Ethnicity and Origin

Hispanics are more likely than non-Hispanics to feel safe on transit. At the same time, Hispanics are more likely to be concerned with privacy, crime, and traveling with people they do not know.

Nonwhites are more likely than whites to feel safe on transit. At the same time, nonwhites are more likely to worry about privacy, crime, and traveling with people they do not know.

Those who grew up outside the United States are more likely to feel safe on transit, but also more likely to worry about traveling with people they do not know.

Age and Gender, Separately

As noted, Millennials are more likely to feel safe on transit, but also more likely to worry about crime and traveling with people they do not know. Men tend to be less concerned with the issue of crime and safety on the public mode trip, while not differing from women about privacy.

Summary: Safety and Privacy. Those that worry *more* about crime and other disturbing behavior include women, nonwhites, Hispanics, younger people, those with less formal education, and those with less income, a demographic pattern like those who state concern for traveling with those they do not know. Logically, perhaps, these are the groups who do indeed face more

danger, or at least worry about it. Importantly, these tend to be the groups who do take transit, and have pro-urban and pro-transit preferences.

5. IMPROVEMENTS TO TRANSIT SERVICES

VARIATION BY AGE AND GENDER

The younger age groups have somewhat higher propensity to say they would use transit more if its overall performance, as measured by travel time, reliability, frequency, and proximity, improved. As age increases, less report that transit ridership would increase with improvement in these four specific service quality attributes. Consistently, and over all age categories, concerns about travel time and reliability get higher evaluation than frequency or proximity. As noted below, gender explains little of the variation concerning these potential improvements to transit.

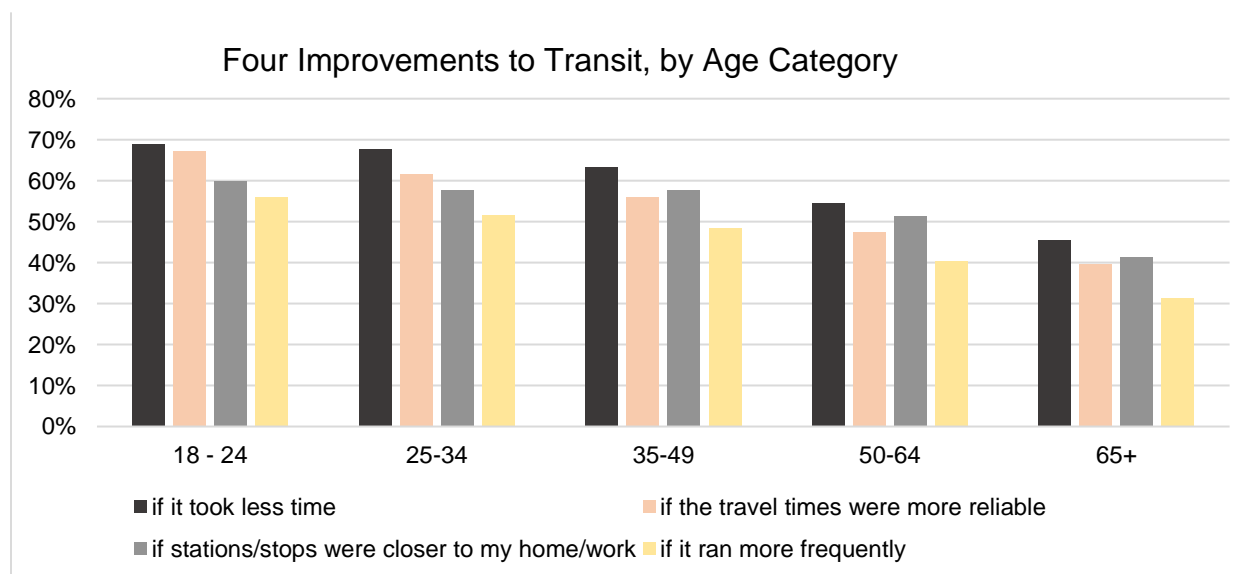


FIGURE 29. EFFECT OF AGE ON FOUR DESIRED CHARACTERISTICS OF THE TRANSIT TRIP

CONCERNS ABOUT TRANSIT SERVICES, VARIATION BY EIGHT SOCIODEMOGRAPHIC CATEGORIES

The study of the relationship between the sociodemographic factors and preferences for improvements in transit reveals small but significant differences between the two paired subgroups in each subcategory. Table 5 shows the subgroup within each demographic category with the higher level of agreement that they would increase their use of transit, by each service improvement.

Income, Education, and Employment

Low-income respondents have a higher propensity than high-income respondents to say that they would increase their use of transit if transit was more reliable and if it ran more frequently. No

significant variation exists by income level for either the statement about less time, or proximity of stations to the respondent's home. Those with a college degree are more likely than those without a college degree to state they would increase transit use for all reasons.

Race and Ethnicity and Origin

Hispanics, nonwhites, and migrants are more likely than their paired subgroups to state that they would increase transit use with each of the service improvements.

Age and Gender, Separately

Millennials are more likely than older groups to state they would increase transit use for all reasons. No statistically valid difference exists between the responses of men and women on whether they would ride transit if its service was improved.

Summary: Responsiveness to improvements. On the question of whether the respondent would increase transit use in response to better service characteristics, the pattern of demographic variation is consistent with the subgroups generally supportive of transit throughout this Technical Appendix. This serves to reinforce the importance of these groups—who tend to have lower incomes and are generally nonwhite and born outside of the United States.

FIVE SUMMARY TABLES FOR 16 SUBGROUPS IN EIGHT DEMOGRAPHIC CATEGORIES

The five tables summarizing the role of eight sociodemographic categories relative to five subject areas have been referenced in the text of the previous five sections. All five tables are presented together here to facilitate reading in the “landscape” orientation.

TABLE 1. SUBGROUPS MORE SUPPORTIVE OF TRANSIT-CONDUCTIVE COMMUNITIES

STATEMENT	SUBGROUP WITH RESPONSE TO STATEMENT <i>MORE SUPPORTIVE OF DENSE, URBAN SETTLEMENT</i>							
	INCOME	EDUCATION	EMPLOYMENT	NONWHITE	HISPANIC	MIGRANT	AGE	GENDER
Mix of people from diverse backgrounds	<i>Not Significant</i>	College	<i>Not Significant</i>	Nonwhite	Hispanic	Not USA	Millennial	Female
Shorter commute distance to my job or school	<i>Not Significant</i>	College	Employed	Nonwhite	Hispanic	Not USA	Millennial	Female
Live within walking distance of stores	Under 50k	College	<i>Not Significant</i>	Nonwhite	Hispanic	Not USA	Millennial	Female
Smaller lot size	Under 50k	No College	Not full-time	<i>Not Significant</i>	<i>Not Significant</i>	<i>Not Significant</i>	<i>Not Significant</i>	Male
Smaller home size	Over 50k	College	Employed	White	Non-His	In USA	Older	Male
People are active in parks	Over 50k	College	Employed	Nonwhite	Hispanic	Not USA	Millennial	Female
Proximity to public transportation	Under 50k	<i>Not Significant</i>	Not full-time	Nonwhite	Hispanic	Not USA	Millennial	Female
Urban is ideal location	Under 50k	<i>Not Significant</i>	Employed	Nonwhite	Hispanic	Not USA	Millennial	<i>Not Significant</i>
Less preference for a longer commute to get a bigger house	<i>Not Significant</i>	College	Not full-time	White	Non-His	<i>Not Significant</i>	Older	Female

*Not Significant = no statistically significant differences between subgroups. Income (below \$50k vs. above \$50k)
 Education (no college started vs. some college+ above)
 Employment (not full-time employed vs. full-time employed)
 Hispanic (Hispanic vs. non-Hispanic)
 Nonwhite (white vs. nonwhite)
 Migration (childhood in the United States vs. childhood outside of the United States)
 Age (below 35 years vs. above 35 years)
 Gender (M/F, shown separately from age category)

TABLE 2. SUBGROUPS WITH MORE SUPPORT OF LOWERED AUTO ORIENTATION AND DEPENDENCE

SUBGROUP WITH <i>HIGHER RESPONSE</i> FOR SHARING, AND INDEPENDENCE FROM AUTO								
STATEMENT	INCOME	EDUCATION	EMPLOYMENT	NONWHITE	HISPANIC	MIGRANT	AGE	GENDER
Participate in sharing programs	Under 50k	<i>Not Significant</i>	Employed	Nonwhite	Hispanic	Not USA	Millennial	<i>Not Significant</i>
Less dependent on cars than my parents	Under 50k	No College	Employed	Nonwhite	Hispanic	Not USA	Millennial	<i>Not Significant</i>
Does NOT value the freedom and independence from cars. (rev)	Under 50k	No College	Not full-time	Nonwhite	Hispanic	Not USA	Millennial	<i>Not Significant</i>
Does NOT feel need to drive car to get where needs to go (rev)	Under 50k	No college	Not full-time	Nonwhite	Hispanic	Not USA	Millennial	<i>Not Significant</i>
Does NOT prefer to be driver rather than passenger (rev)	Under 50k	No College	Not full-time	Nonwhite	<i>Not Significant</i>	<i>Not Significant</i>	Millennial	Female
Someone else driving is desirable	Under 50k	No College	<i>Not Significant</i>	Nonwhite	Hispanic	Not USA	Millennial	Female
People important to me prefer to drive less	Under 50k	<i>Not Significant</i>	Employed	Nonwhite	Hispanic	Not USA	Millennial	<i>Not Significant</i>
Does NOT need the flexibility provided by the car (rev)	Under 50k	No College	Not full-time	Nonwhite	Hispanic	<i>Not Significant</i>	Millennial	Female
*Not Significant = no statistically significant differences between subgroups								
Income (below \$50k vs. above \$50k)								
Education (no college started vs. some college+ above)								
Employment (not full-time employed vs. full-time employed)								
Hispanic (Hispanic vs. non-Hispanic)								
Nonwhite (white vs. nonwhite)								
Migration (childhood in the United States vs. childhood outside of the United States)								
Age (below 35 years vs. above 35 years)								
Gender (M/F, shown separately from age category)								

TABLE 3. SUBGROUPS WITH HIGHER PRO-ENVIRONMENTAL POSITIONS

STATEMENT	SUBGROUP WITH <i>HIGHER PRO-ENVIRONMENTAL POSITION</i> ON STATEMENT							
	INCOME	EDUCATION	EMPLOYMENT	NONWHITE	HISPANIC	MIGRANT	AGE	GENDER
Working together, we could improve future for the earth	Not Significant	Not Significant	Not Significant	Nonwhite	Not Significant	Not Significant	Not Significant	Female
Does Not believe reducing environmental pollution should cost me money (rev)	Over 50k	College	Not full-time	White	Non-His	Not Significant	Older	Not Significant
Would switch mode to improve air quality	Under 50k	Not Significant	Employed	Nonwhite	Hispanic	Not USA	Millennial	Not Significant
Does not think that environmental concerns are overblown (rev)	Under 50k	Not Significant	Not full-time	White	Non-His	Not Significant	Older	Female
Like doing good for the environment with transit	Not Significant	College	Employed	Nonwhite	Hispanic	Not USA	Millennial	Female
Environmental impact affects mode choice	Under 50k	Not Significant	Employed	Nonwhite	Hispanic	Not USA	Millennial	Female

*Not Significant = no statistically significant differences between subgroups
Income (below \$50k vs. above \$50k)
Education (no college started vs. some college+ above)
Employment (not full-time employed vs. full-time employed)
Hispanic (Hispanic vs. non-Hispanic)
Nonwhite (white vs. nonwhite)
Migration (childhood in the United States vs. childhood outside of the United States)
Age (below 35 years vs. above 35 years)
Gender (M/F, shown separately from age category)

TABLE 4. SUBGROUPS WITH LESS CONCERN FOR PERSONAL SAFETY, CRIME, AND PRIVACY ON PUBLIC MODES

STATEMENT	SUBGROUP WITH THE LOWER FEARS ABOUT SAFETY AND PRIVACY IN TRANSIT TRIP							
	INCOME	EDUCATION	EMPLOYMENT	NONWHITE	HISPANIC	MIGRANT	AGE	GENDER
Do not feel privacy is important to me when I make a trip (rev)	<i>Not Significant</i>	<i>Not Significant</i>	Not full-time	White	Non-His	<i>Not Significant</i>	<i>Not Significant</i>	<i>Not Significant</i>
Do not have a personal safety concern when I make a trip (rev)	<i>Not Significant</i>	<i>Not Significant</i>	<i>Not Significant</i>	<i>Not Significant</i>	<i>Not Significant</i>	<i>Not Significant</i>	Millennial	Male
Do not worry about crime/other disturbing behavior (rev)	Over 50k	College	<i>Not Significant</i>	White	Non-His	<i>Not Significant</i>	Older	Male
Feel safe when riding public transportation	Over 50k	College	Employed	Nonwhite	Hispanic	Not USA	Millennial	Male
Traveling with people I do not know	Over 50	College	Not full-time	White	Non-His	USA	Older	Male
Do not feel privacy in commute affects mode choice (rev)	Over 50k	<i>Not Significant</i>	Not full-time	White	Non-His	<i>Not Significant</i>	Older	<i>Not Significant</i>

*Not Significant = no statistically significant differences between subgroups
Income (below \$50k vs. above \$50k)
Education (no college started vs. some college+ above)
Employment (not full-time employed vs. full-time employed)
Hispanic (Hispanic vs. non-Hispanic)
Nonwhite (white vs. nonwhite)
Migration (childhood in the United States vs. childhood outside of the United States)
Age (below 35 years vs. above 35 years)
Gender (M/F, shown separately from age category)

Table 5. SUBGROUPS WHO MOST PREDICT INCREASED TRANSIT RIDERSHIP IN RESPONSE TO IMPROVED SERVICE

I WOULD RIDE TRANSIT MORE IF...	SUBGROUP WHO MOST RESPOND THEY WOULD RIDE TRANSIT MORE, IF...							
	INCOME	EDUCATION	EMPLOYMENT	NONWHITE	HISPANIC	MIGRANT	AGE	GENDER
it took less time	<i>Not Significant</i>	College	Employed	Nonwhite	Hispanic	Not USA	Millennial	<i>Not Significant</i>
the travel times were more reliable	under 50k	College	Employed	Nonwhite	Hispanic	Not USA	Millennial	<i>Not Significant</i>
stations/stops were closer to home/work	<i>Not Significant</i>	College	Employed	Nonwhite	Hispanic	Not USA	Millennial	<i>Not Significant</i>
it ran more frequently	under 50k	College	Employed	Nonwhite	Hispanic	Not USA	Millennial	<i>Not Significant</i>
it offered a more direct route to work	<i>Not Significant</i>	College	Employed	Nonwhite	Hispanic	Not USA	Millennial	<i>Not Significant</i>

*Not Significant = no statistically significant differences between subgroups
Income (below \$50k vs. above \$50k)
Education (no college started vs. some college+ above)
Employment (not full-time employed vs. full-time employed)
Hispanic (Hispanic vs. non-Hispanic)
Nonwhite (white vs. nonwhite)
Migration (childhood in the United States vs. childhood outside of the United States)
Age (below 35 years vs. above 35 years)
Gender (M/F, shown separately from age category)

