FOUNDATION FOR TRAFFIC SAFETY

Alternative Transportation Use and Life Satisfaction Among Older Drivers: AAA LongROAD Study

This research brief examines changes in alternative transportation use and satisfaction over time among older adults using data from the AAA Longitudinal Research on Aging Drivers (LongROAD) study (Kelly-Baker et al., 2017; Molnar et al., 2024). Eight transportation modes other than driving—public bus, train/subway, taxi, special community transportation, ride with a friend or family, volunteer driver, rideshare (e.g. Uber or Lyft), and walking or biking—and satisfaction with daily life, family, and health were researched to better understand fluctuations over a five-year study period. Reported income at baseline was a large determinant of alternative transportation use and life satisfaction among study participants, and riding with a friend or family member was a popular mode of transportation over the course of the study. However, regression analyses indicated that satisfaction with daily life, family life, and health were not associated with the use of most of the alternative transportation modes at baseline, or with changes in use of an alternative transportation mode relative to baseline. The current study highlights the need for more and diverse alternative transportation options, especially outside of urban areas, to increase safe mobility and transportation equity for older adults in the United States.

METHODS

This study assessed the relationship between traveling by modes other than driving oneself and self-reported life and health satisfaction in a sample of licensed older drivers. Data were from the AAA LongROAD study (Molnar et al., 2024), a prospective cohort study of 2,990 participants aged 65 to 79 at the time of recruitment from five diverse study sites (Ann Arbor, MI; Baltimore, MD; Cooperstown, NY; Denver, CO; and San Diego, CA). The design and methods of the AAA LongROAD study are described in detail by Molnar et al. (2024); aspects most relevant to the current study are summarized below. The data collected from baseline to the fifth and final year provides longitudinal insight into the use of alternative transportation, life satisfaction, and associated demographic factors.

The data used in this study were derived from participant responses from the LongROAD Driving, Health, and Functioning Questionnaire, which was administered roughly annually over the duration of the study, which spanned from July 2015 to September 2022, with enrollment ending in March 2017. The questionnaire asked participants about their use of alternative transportation modes. Participants were asked to respond "Yes" or "No" regarding use of the following alternative transportation options within the past three months:

- Public bus
- Train/subway
- Taxi
- Special community transportation (e.g., Dial-A-Ride)

- Ride with friend/family as a passenger
- Volunteer driver

For other modes not mentioned in the survey, participants were asked to indicate the specific mode(s) of transportation used. Use of rideshare services and walking or biking were extracted from these open-ended responses for analysis, in addition to the modes noted above.

Participants were asked to identify their level of satisfaction with their (1) daily life and leisurely activities, (2) health, and (3) family life using a Likert scale of 1–5 with one representing "Not at all satisfied" and five representing "Completely satisfied."

ANALYSIS

Descriptive statistics were tabulated, including use of alternative transportation modes and satisfaction with daily life, family, and health by study year and in relation to demographic factors at baseline. Random-effects linear regression models were used to assess the association between the measures of life satisfaction and use of alternative transportation modes. The models examined both differences between participants' use of alternative transportation modes at baseline and participants' changes in alternative transportation use relative to baseline in relation to life satisfaction over time. The models were adjusted for the following demographic variables, both at baseline, and over time relative to baseline:

- Age, sex, race/ethnicity, marital status, living situation, and income
- Rural-Urban Commuting Area (RUCA) code category; RUCA categories were classified as follows (Economic Research Service, 2023):
  - Metropolitan core
  - Metropolitan non-core
  - Micropolitan/small town/rural
- Perceived driving-related abilities, and reported satisfaction with mobility and enjoyment of driving.

Models were also adjusted for COVID (before/after the onset of the COVID-19 pandemic) and interval (study year). Participant data for a given year of the study were excluded from analysis if data were missing for any of the variables included in the models. Data collected from participants who reported they had permanently stopped driving in a given study year were excluded from analyses for that and subsequent study years.

RESULTS

Descriptives at Baseline

There were 2,777 participants included in the current analysis. Demographic data on age, sex, race and ethnicity, income, living situation, marital status, and RUCA category were analyzed in relation to alternative transportation mode use and satisfaction with daily life, family, and health (Table 1).

Participants aged 75 to 79 reported using the train or subway at a prevalence nearly 9 percentage points lower than other age groups. Twenty percent of those who lived in the metropolitan core (urban) RUCA category reported using a train or subway compared to 9.9% of their Metropolitan Non-Core counterparts. The same pattern was also observed for the reported use of taxis. Participants who reported earning less than $20,000 a year at baseline had the lowest prevalence of riding with friends or family (71.1%), while those who reported earning

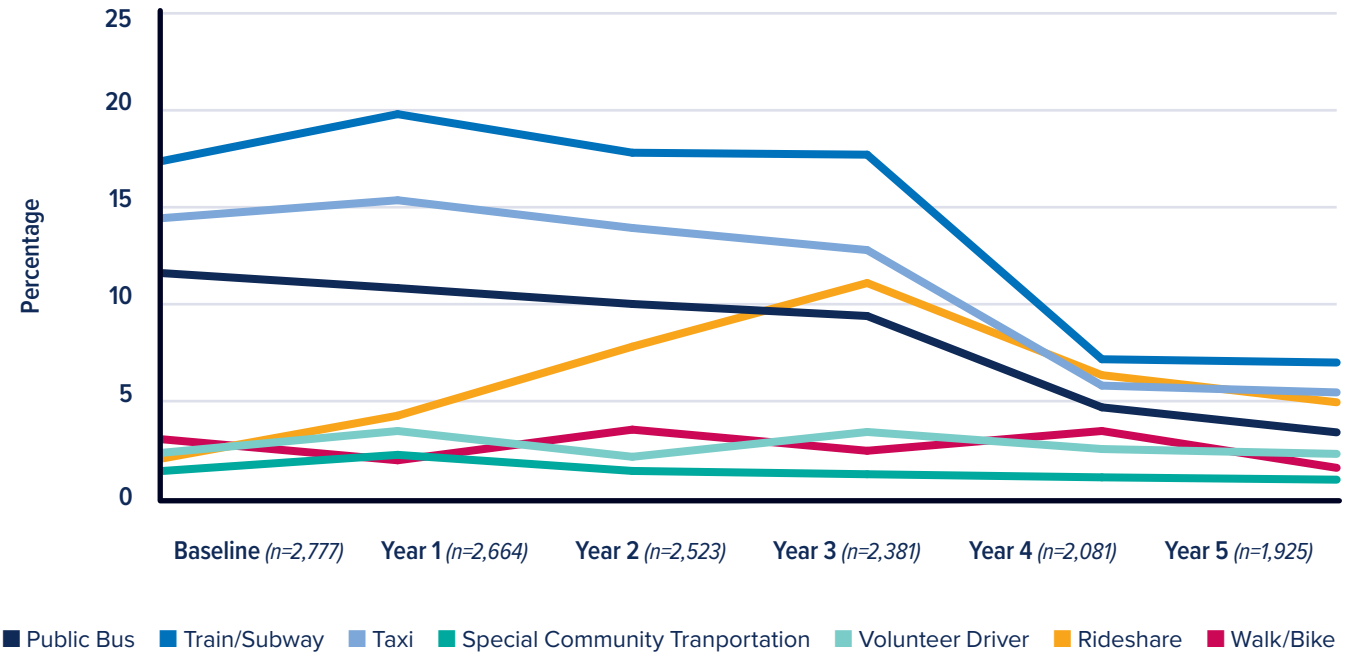
$100,000 or more a year reported using this transportation mode at the highest rate (90.2%).

Income level was a large determinant of satisfaction (Table 2). Those who earned less than $20,000 a year had the lowest-reported satisfaction for daily life (3.61 [SD 0.90]), family life (3.71 [SD 0.91]), and health (3.49 [SD 0.96]); however, those who reported making between $80,000 and $99,999 a year and those making $100,000 or more a year had the highest, and identical, levels of satisfaction with health.

Changes Over Time

An overall downward trend was observed in alternative transportation use over the course of the study (Figure 1). Participants reported the lowest use of special community transportation, volunteer driver, and walking and/or biking throughout the study. Rideshare usage steadily climbed from baseline to Year 3 (from 2.05% to 11.09%) but dropped to 4.94% by Year 5. Public bus, taxi, and train and/or subway use also declined from Year 3 to Year 4 then remained steady throughout the final year of the study. Compared to the other seven alternative transportation modes, ride with friend/family (excluded from figure) was highly reported throughout the study, with about 87% of participants reporting use each year from baseline to Year 3, declining to about 80% in the final two intervals.

Satisfaction with daily life, family, and health (Figure 2) was relatively consistent across time and between participants, with all average satisfaction scores falling within the range of 3.64 (SD 0.84) to 4.05 (SD 0.78) on a 5-point Likert scale. Average satisfaction with health was the lowest of the three and decreased on average for each year studied. Over the course of data collection, the weighted average of all participants' health satisfaction dropped from 3.77 (SD 0.83) at baseline to 3.64 (SD 0.84) at Year 5, a 0.13 difference. This is the largest decrease



Note: Riding with Friend/Family is excluded from the figure.

Figure 1. Participant Use of Alternative Transportation Use over Time

Table 1. Alternative transportation use in relation to participant demographics at baseline

Demographics		n	Alternative Transportation Mode (%)							
			Public Bus	Train/ Subway	Taxi	Special Community Transportation	Ride with Friend/ Family	Volunteer Driver	Rideshare	Walk/Bike
Age	65–69	1,162	13.7%	19.4%	14.9%	1.8%	86.9%	2.3%	2.0%	3.3%
	70–74	963	11.2%	19.5%	16.3%	1.6%	86.9%	1.8%	2.2%	2.8%
	75–79	652	8.4%	10.7%	10.9%	0.5%	85.3%	3.2%	2.0%	2.9%
Gender	Male	1,334	12.8%	19.6%	16.2%	1.1%	82.5%	3.2%	2.0%	3.7%
	Female	1,443	10.5%	15.4%	12.8%	1.7%	90.2%	1.5%	2.1%	2.4%
Race/Ethnicity	White	2,384	11.6%	17.7%	15.1%	1.4%	87.5%	2.3%	2.2%	3.0%
	Black	205	10.7%	15.6%	5.4%	1.5%	80.0%	2.0%	0.0%	2.9%
	Hispanic	73	6.8%	11.0%	15.1%	1.4%	80.8%	4.1%	2.7%	0.0%
	Asian/Alaska Native/Native Hawaiian/Pacific Islander	62	16.1%	22.6%	19.4%	1.6%	85.5%	3.2%	4.8%	1.6%
	Other/Unknown	53	17.0%	15.1%	15.1%	1.9%	75.5%	3.8%	0.0%	9.4%
Income	Less than $20,000	128	14.1%	10.2%	5.5%	3.1%	71.1%	1.6%	1.6%	5.5%
	$20,000–$49,999	620	7.7%	8.7%	4.5%	1.0%	83.6%	1.9%	0.6%	1.6%
	$50,000–$79,999	701	10.7%	14.4%	9.4%	1.6%	86.3%	1.6%	0.7%	3.6%
	$80,000–$99,999	405	12.1%	19.0%	14.1%	0.7%	89.1%	2.7%	0.7%	3.0%
	$100,000+	894	14.5%	25.8%	26.9%	1.7%	90.2%	3.2%	4.6%	3.4%
	Unknown	29	6.9%	24.1%	10.3%	0.0%	75.9%	0.0%	6.9%	0.0%
Living Situation	Independent Living	2,678	11.8%	17.7%	14.4%	1.3%	86.8%	2.3%	2.1%	3.0%
	Non-Independent Living	87	5.7%	9.2%	14.9%	3.4%	79.3%	3.4%	1.1%	2.3%
	Unknown	12	0.0%	8.3%	16.7%	16.7%	75.0%	0.0%	0.0%	8.3%
Marital Status	Married or Living with a Partner	929	11.8%	15.2%	11.6%	1.0%	83.0%	1.4%	1.4%	3.2%
	Separated/Divorced/ Widowed/Never Married	1829	11.4%	18.4%	16.0%	1.6%	88.4%	2.8%	2.4%	3.0%
	Unknown	19	15.8%	26.3%	5.3%	0.0%	84.2%	5.3%	5.3%	0.0%
RUCA Category	Metropolitan Core	2,005	13.6%	20.2%	16.6%	1.7%	85.7%	2.3%	2.8%	3.7%
	Metropolitan Non-Core	393	5.6%	9.9%	8.1%	0.3%	87.5%	2.8%	0.0%	1.5%
	Micropolitan/ Small Town/Rural	379	7.1%	10.6%	9.8%	0.8%	89.7%	1.8%	0.0%	1.1%

Table 2. Average satisfaction by participant demographics at baseline

Demographics		n	Satisfaction Type [Mean (SD)]		
			Satisfaction with Daily Life*	Satisfaction with Family*	Satisfaction with Health*
Age	65–69	1,162	3.94 (0.72)	4.01 (0.80)	3.77 (0.85)
	70–74	963	3.99 (0.71)	4.08 (0.74)	3.80 (0.81)
	75–79	652	4.02 (0.72)	4.07 (0.81)	3.75 (0.83)
Gender	Male	1,334	3.98 (0.71)	4.08 (0.77)	3.76 (0.83)
	Female	1,443	3.96 (0.73)	4.01 (0.79)	3.79 (0.83)
Race/Ethnicity	White	2,384	3.98 (0.71)	4.05 (0.77)	3.78 (0.83)
	Black	205	3.93 (0.75)	3.99 (0.82)	3.68 (0.92)
	Hispanic	73	4.12 (0.73)	4.10 (0.85)	3.85 (0.86)
	Asian/Alaska Native/Native Hawaiian/Pacific Islander	62	3.90 (0.69)	4.02 (0.71)	3.65 (0.60)
	Other/Unknown	53	3.85 (0.74)	3.94 (1.10)	3.76 (0.85)
Income	Less than $20,000	128	3.61 (0.90)	3.71 (0.91)	3.49 (0.96)
	$20,000–$49,999	620	3.89 (0.75)	3.92 (0.85)	3.74 (0.84)
	$50,000–$79,999	701	3.98 (0.74)	4.08 (0.76)	3.73 (0.87)
	$80,000–$99,999	405	4.05 (0.67)	4.11 (0.71)	3.84 (0.78)
	$100,000+	894	4.04 (0.64)	4.13 (0.74)	3.84 (0.79)
	Unknown	29	4.03 (0.73)	3.97 (0.57)	3.79 (0.73)
Living Situation	Independent Living	2,678	3.98 (0.72)	4.05 (0.78)	3.78 (0.83)
	Non-Independent Living	87	3.86 (0.78)	3.93 (0.78)	3.56 (0.86)
	Unknown	12	4.00 (0.74)	4.00 (0.74)	3.67 (0.78)
Marital Status	Married or Living with a Partner	929	3.86 (0.78)	3.84 (0.86)	3.72 (0.85)
	Separated/Divorced/ Widowed/Never Married	1829	4.03 (0.67)	4.15 (0.71)	3.80 (0.82)
	Unknown	19	3.79 (0.79)	3.89 (0.83)	3.95 (0.62)
RUCA Category	Metropolitan Core	2,005	3.96 (0.72)	4.03 (0.79)	3.74 (0.83)
	Metropolitan Non-Core	393	4.00 (0.70)	4.09 (0.76)	3.84 (0.82)
	Micropolitan/ Small Town/Rural	379	4.03 (0.73)	4.09 (0.75)	3.86 (0.85)

*Satisfaction was reported on a scale of 1–5, with 1 indicating "Not at all satisfied" and 5 indicating "Completely Satisfied."

among all types of satisfaction across all years. Average satisfaction with daily life was reported at higher levels than satisfaction with health and slightly fluctuated throughout the course of the study but decreased overall. Further, daily life satisfaction was observed to have the sharpest decrease in satisfaction between two study years: average scores decreased by 2.5% (0.10 percentage points) from Year 3 to Year 4. The highest levels of satisfaction were observed in relation to family. Satisfaction with family remained consistent and experienced the least amount of change over 5 years, declining from an average of 4.05 (SD 0.78) at baseline to 4.00 during Year 4 (SD 0.82) and Year 5 (SD 0.79).

Regression Results

As shown in Table 3, regression analyses indicated that satisfaction with daily life, family life, and health were not associated with use of most of the alternative transportation modes at baseline, or with changes in use of an alternative transportation mode relative to baseline. When examining differences between individuals at baseline in relation to life satisfaction, reported use of train or subway was associated with slightly higher satisfaction with both daily life and health. Riding with a friend or family member at baseline was similarly associated with slightly higher satisfaction with daily life, but use of this mode at baseline was also associated with a nearly equivalent decrease in satisfaction with one's health. Those who reported walking or biking for transportation at baseline had moderately higher satisfaction with health.

When examining associations between participants' changes in alternative transportation mode use relative to baseline and life satisfaction over time, in comparison with participants who did not change their use of alternative transportation relative to baseline, individuals who increased their use of train or

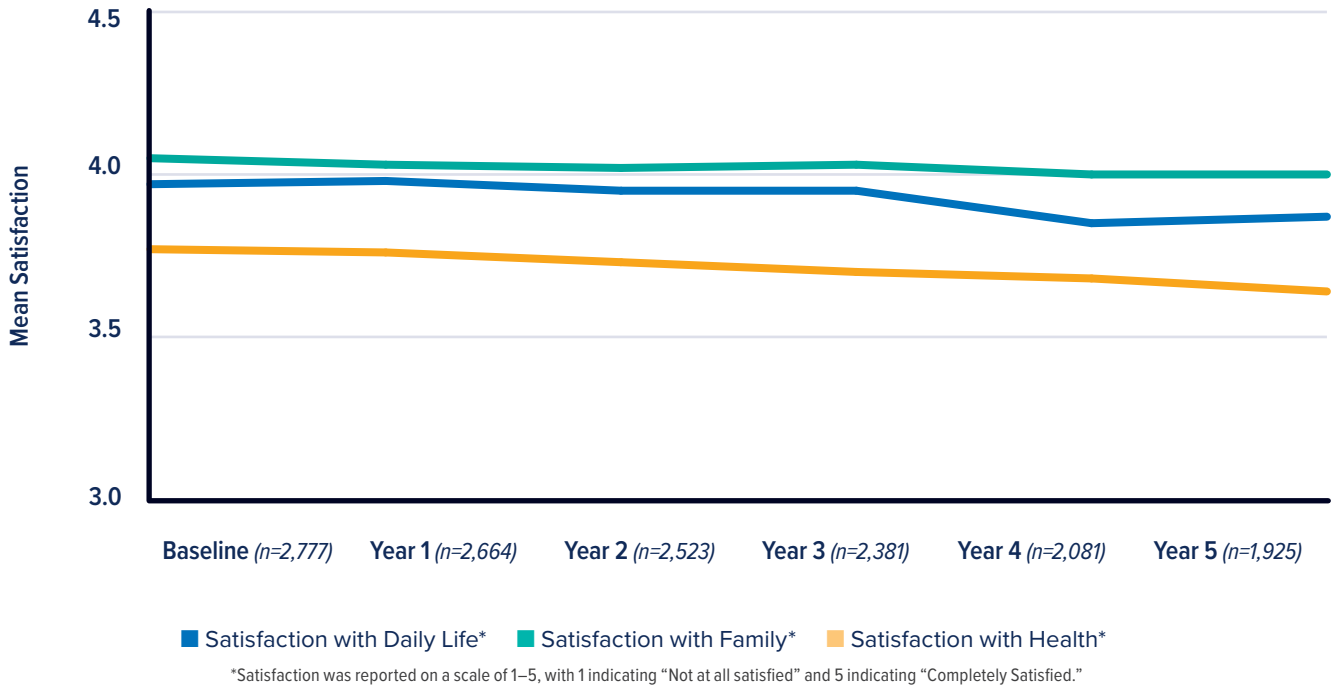


Figure 2. Mean Satisfaction with Daily Life, Family, and Health over Time

Table 3. Results of linear regression models of life satisfaction in relation to differences between individuals' use of alternative transportation modes at baseline and changes in use relative to baseline.

Alternative Transportation			Satisfaction with Daily Life*		Satisfaction with Family*		Satisfaction with Health*	
			Coef.	95% CI	Coef.	95% CI	Coef.	95% CI
Differences between individuals at baseline	Public Bus		0.03	(−0.05, 0.10)	−0.03	(−0.11, 0.05)	0.12	(0.03, 0.20)
	Train/Subway		**0.08**	(0.02, 0.15)	0.06	(−0.01, 0.13)	**0.08**	(0.00, 0.12)
	Taxi		−0.02	(−0.09, 0.05)	−0.02	(−0.10, 0.05)	0.01	(−0.07, 0.09)
	Special Community Transportation		0.09	(−0.11, 0.30)	0.20	(−0.03, 0.42)	0.18	(−0.06, 0.41)
	Ride with Friend/Family		**0.09**	(0.02, 0.16)	0.16	(0.09, 0.24)	**−0.08**	(−0.15, −0.00)
	Volunteer Driver		0.13	(−0.03, 0.30)	0.14	(−0.04, 0.32)	0.05	(−0.13, 0.24)
	Rideshare		0.02	(−0.14, 0.18)	−0.03	(−0.21, 0.15)	0.11	(−0.07, 0.29)
	Walk/Bike		−0.06	(−0.20, 0.08)	−0.11	(−0.26, 0.04)	**0.17**	(0.01, 0.33)
Change over time relative to baseline*	Public Bus	−	0.02	(−0.03, 0.08)	0.03	(−0.03, 0.09)	−0.05	(−0.11, 0.01)
		+	0.00	(−0.06, 0.05)	0.00	(−0.06, 0.05)	**0.06**	(0.00, 0.12)
	Train/Subway	−	**−0.06**	(−0.11, −0.01)	−0.03	(−0.08, 0.02)	0.01	(−.04, 0.07)
		+	**0.09**	(0.04, 0.13)	0.02	(−0.02, 0.07)	**0.05**	(0.00, 0.10)
	Taxi	−	0.02	(−0.03, 0.07)	0.00	(−0.05, 0.06)	0.04	(−0.02, 0.09)
		+	−0.02	(−0.07, 0.03)	−0.02	(−0.07, 0.03)	−0.01	(−0.06, 0.04)
	Special Community Transportation	−	0.08	(−0.09, 0.24)	−0.13	(−0.31, 0.04)	0.03	(−0.15, 0.20)
		+	−0.02	(−0.12, 0.07)	−0.03	(−0.13, 0.07)	0.01	(−0.09, 0.11)
	Ride with Friend/Family	−	**−0.04**	(−0.08, −0.00)	**−0.05**	(−0.09, −0.01)	−0.02	(−0.07, 0.02)
		+	0.02	(−0.12, 0.07)	**0.07**	(0.01, 0.13)	−0.02	(−0.08, 0.04)
	Volunteer Driver	−	−0.03	(−0.16, 0.11)	0.01	(−0.12, 0.15)	−0.04	(−0.18, 0.09)
		+	−0.01	(−0.07, 0.06)	0.04	(−0.02, 0.11)	0.02	(−0.05, 0.09)
	Rideshare	−	0.01	(−0.12, 0.13)	0.00	(−0.13, 0.13)	0.03	(−0.10, 0.16)
		+	0.01	(−0.04, 0.06)	−0.01	(−0.6, 0.04)	−0.04	(−0.09, 0.01)
	Walk/Bike	−	0.00	(−0.11, 0.12)	0.06	(−0.05, 0.18)	−0.04	(−0.16, 0.07)
		+	0.04	(−0.03, 0.11)	0.00	(−0.07, 0.07)	0.03	(−0.05, 0.10)

*Among participants who decreased (−) or increased (+) use of the transportation mode compared to participants with no change in use of that transportation mode relative to baseline
Models adjusted for: age at baseline, income at baseline, change in income over time, sex, marriage status at baseline, change in marriage status over time, satisfaction with mobility at baseline, change in satisfaction with mobility over time, perceived driving-related abilities at baseline, change in perceived driving-related abilities over time, enjoyment of driving at baseline, change in enjoyment of driving over time, race/ethnicity, living situation, RUCA category at baseline, change in RUCA category over time, COVID, and interval.
CI=Confidence interval; **bolded** coefficients significant at 95% CI level.

subway had slightly higher satisfaction with both daily life and health, while those who decreased their use of train or subway had slightly lower satisfaction with daily life. Those who increased their use of riding with friends or family had slightly higher satisfaction with family life, while those who decreased riding with friends or family had slightly lower satisfaction with both daily life and family life. While use of public buses at baseline was not associated with any of the life satisfaction measures, increased use of public buses relative to baseline was associated with slightly higher satisfaction with health.

DISCUSSION

This study aimed to explore changes in alternative transportation use and satisfaction over time among older adults in the LongROAD study. Results reveal that older adults who made $20,000 or less per year at baseline reported riding with their friends or family less frequently than any other income category, while those making $100,000 or more reported the highest use of this alternative mode of transportation. Study participants with the lowest annual incomes reported the lowest satisfaction with daily life, family, and health when compared to all other income categories. Those making $20,000 or less had a mean health satisfaction score of 3.49 (compared to 3.73 to 3.84 among participants making more than $20,000), which is the lowest mean score of all satisfaction types across all demographic categories examined. Interestingly, older adults in the two highest earning categories ($80,000–$99,999, and more than $100,000) had identical mean scores for health satisfaction. These findings underscore the relationship between reported annual income and health satisfaction. Additionally, older adults who were not married or living with a partner at baseline had a mean score of 4.15 for satisfaction with their family, the highest mean score across all three satisfaction types and demographic categories examined. This may indicate that older adults who are separated, divorced, widowed, or never married are content with other familial relationships outside of a romantic partner.

Use of all of the alternative transportation modes examined except rideshare decreased over the course of the study, with the largest decreases in use of train or subway, taxi, and public bus. Because enrollment in the LongROAD cohort occurred on a rolling basis over nearly two calendar years (June 2015 to March 2017), the onset of the COVID-19 pandemic in March 2020 overlapped with varying years of data for participants, mainly the latter years of data collection. While evaluating the impact of the pandemic on alternative transportation use is beyond the scope of this research brief, it is likely that the decreases seen in use of public transit and taxis was due at least in part to pandemic risks. All three life satisfaction measures decreased somewhat over the study period: satisfaction with family decreased only slightly, while satisfaction with daily life and health decreased moderately. This may reflect the greater impacts of the pandemic on daily life and health relative to family life, as many families were able to isolate together.

After adjustment for covariates, including whether the data were collected before or after the onset of the COVID-19 pandemic, the regression analyses showed that use of most of the included alternative transportation modes at baseline, and changes in use relative to baseline, were not associated with satisfaction with daily life, health, or family, with a few exceptions. Use of train or subway at baseline was associated with slightly higher satisfaction with daily life and health, as was increased use of train or subway relative to baseline, while decreased use was associated with slightly lower satisfaction with

daily life. Riding with a friend or family member at baseline was associated with a slightly higher satisfaction with daily life but also slightly lower satisfaction with health; those who increased their use of these rides over the study period had slightly higher satisfaction with family life, while those who decreased rides with friends or family had slightly lower satisfaction with daily and family life. In addition, walking or biking for transportation at baseline was associated with moderately higher satisfaction with their health (0.17), with the greatest statistically significant association for any mode and satisfaction type. Given that life satisfaction was measured on a scale from 1 to 5, it is unclear whether changes of this magnitude or smaller are noticeable or meaningful to individuals.

The study protocol included a follow-up question to gauge the frequency of use of any of the alternative transportation modes participants had reported using. However, the metric—the reported percentage of all trips taken using a given mode—was difficult to interpret relative to trips taken by driving oneself and other alternative modes. There was no information collected regarding trip length, which surely varies by mode. Further, few participants reported using any of the alternative modes for more than a small proportion of their trips. Treating usage as binary may have resulted in under- or over-estimating the associations between use of alternative transportation and life satisfaction. Walking or biking and rideshare use were extracted from open-ended questions without prompts, it is possible these modes were unintentionally underreported. It was not possible to take into account the availability or quality of the various alternatives to driving oneself that were available to participants, which may have changed over time. It is also important to keep in mind that the results reflect older adults who still drive themselves with at least some regularity but not older adults who have ceased driving or never drove, or older adults' mobility overall.

Older adults need ways to safely move throughout the communities in which they live, work, and visit that span beyond their personal vehicles, especially when considering that car dependence is associated with lower life satisfaction (Saadaoui et al., 2025) and higher levels of stress (Wener & Evans, 2011). The alternative transportation modes presented in this brief—public bus, train/subway, taxi, special community transportation, ride with friend or family, volunteer driver, rideshare, and walk/bike—are important options for road users of all ages, but especially for older adults. However, not all modes are equally feasible throughout the U.S. Public transit options, such as a bus or a train or subway, are typically only available in urban, metropolitan areas. When such transportation modes are primarily limited to the suburbs and cities, a large portion of the aging population are excluded from accessing and using them. This is an equity concern. Buses, in particular, are more adaptable and more widely used than trains among those who depend on public transportation, thus offering greater benefits for equity (Litman, 2024).

All eight alternative transportation modes mentioned in this brief should be made viable options for all road users, including older adults. Advocacy is needed for more diverse transportation options, especially outside of larger cities and in rural areas, which typically lack public transit. Expanding the safe mobility of older adults is not only beneficial for this demographic, but for everyone. Public transportation in particular has many benefits. The low cost associated with these transportation options may be helpful for older adults who report a low annual income and have limited financial resources. Other alternative transportation options like special community transportation or rideshares like Uber or Lyft may be too costly to use on a regular basis and may not be available in all communities (Bayne et al., 2021). Older adults may also be deterred by safety concerns or technological barriers to access rideshare (Bayne

et al., 2021). Older drivers may also lack awareness of these options. Public transportation has been found to be a safer option than cars. In the U.S., injury and fatality rates are 5 and 23 times lower for public bus occupants than car occupants, respectively (Beck et al., 2007; Morency et al., 2018). In addition to reducing motor vehicle casualties, public transportation can also reduce air pollution and related respiratory illnesses and increase physical activity (Centers for Disease Control, 2024). Additionally, low-cost and safe transportation options are particularly important for older adults who have reduced or ceased driving for any reason. Public transportation promotes the safe mobility of older adults and can help improve traffic conditions for all road users by increasing safety and reducing congestion.

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